AN EXAMINATION OF HEALTH PROVIDERS' HPV VACCINATION BEHAVIORS, PERCEIVED BARRIERS AND SUPPORTS: A FOUR STATE ANALYSIS

BY

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Dedication and Acknowledgements

I would like to dedicate this dissertation to Cheryl McCave and Patsy McCave, both of whom push me everyday to make them proud.

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Abstract

Human papillomavirus (HPV) is the single most common sexually transmitted infection (STI) in the United States. Each year it is the cause of nearly 4,000 deaths in women. In 2006, the first vaccine, Gardasil™, was released into the market for females ages 9 to 26, with the CDC targeting girls ages 11 and 12 years old for vaccination. This vaccine has created a wave of new state policy initiatives aimed at promoting the vaccine, some of which have caused great controversy. Currently, most of the literature has focused on intentions of young women, parents, and health providers to vaccinate against HPV. Results indicated that several barriers may inhibit vaccination, particularly for pre-adolescent girls. This study is one of the first to examine actual vaccination behaviors, as well as current barriers and supports experienced by health providers. A stratified random sample of health providers was selected in four states with varying state policy initiatives. Out of 1490 health providers, 227 responded to a survey that asked about their vaccination behaviors and their perceived barriers and supports to vaccination. Results indicated that health providers are vaccinating older females at significantly higher rates than younger teens and pre-adolescents in three of the four states. Additionally, state policy does seem to have some relationship with health providers' HPV vaccination of girls 13-17. Further, fewer barriers faced by health providers was predictive of increased vaccination rates for providers vaccinating girls 9-12 and girls 13-17. Important barriers to consider are financial burden and negative perception of parents about vaccination, with key supports including personal belief in the positive impact of the

vaccine and a personal comfort level talking with parents about the vaccine. While there are limitations with the generalizability of this study, there are important implications for future researchers, health providers, consumers, and policy makers raised by this study. Given social work's commitment to reducing barriers for consumers and improving supports that will foster health promoting behavior, understanding the unique perspectives of key gatekeepers, namely health providers, is imperative.

Chapter 1: Introduction to the Problem/Needs Statement

Human Papillomavirus as a Social Problem

Until recently, the burden of Human Papillomavirus (HPV), the single most common sexually transmitted infection (STI) in America, has fallen on both society and the women and men infected. There are over 6 million new infections of genital HPV annually, which is responsible for cervical cancer, genital warts, and anogenital cancers (Markowitz, et al., 2007). Additionally, HPV can cause penile cancer and recurrent respiratory papillomatosis (RRP) in infants whose mothers are infected with HPV (Gudeman, 2007). While 80 percent of individuals will be infected with HPV at some point in their lifetime, most infections are asymptomatic or spontaneously regress. Nearly 27 percent of girls and women are infected with HPV at any given time, with an increase to 45 percent for females aged 14 to 24 (Gostin & DeAngelis, 2007). With such high rates of infection, it is not surprising that in 2000, genital HPV cost the nation $2.9 billion in direct medical costs (Chesson, Blandford, Gift, Tao & Irwin, 2004).

Even more costly are the lives lost: in 2008, it is expected that 3,870 women will die in the United States from cervical cancer, many of which will be low-income and minority women (Markowitz, et al., 2007). Currently, African-Americans are 1.5 times more likely to experience an incidence of cervical cancer and two times more likely to experience mortality than Caucasian women. Incidence rates for Hispanic and some Asian subpopulations are also higher than Caucasian rates. Cervical cancer

mortality rates are two to five times higher for Native American women than for Caucasian women (Smith, Christopher, & McCormick, 2004). Women of Mexican descent receive the least preventative care services within Latina populations (Borrayo & Jenkins, 2003). Southeastern immigrants have the lowest levels of Pap screenings of all racial/ethnic populations in America (Jackson, et al., 2000). Finally, southern states have higher incidence of cervical cancer as well (Markowitz, et al., 2007).

The burden, however, may be lifted in the upcoming years, as a new technology of healthcare has entered the picture. On June 8th, 2006, the U.S. Food and Drug Administration (FDA) approved Gardasil ™ as the first vaccine to protect women between the ages of 9 and 26 against HPV (Markowitz, et al., 2007). In 2007, the Advisory Council on Immunization Practices (ACIP) recommended that all girls aged 11 and 12 be vaccinated against HPV, with the indication that girls can be vaccinated as early as 9 years of age, and older females between the ages of 13 and 26 can receive the vaccine as well. In the United Kingdom (UK), research has estimated the impact for giving the vaccine to a cohort of 12-year-old girls at 100 percent coverage would reduce 70 percent of high-grade cervical cancer lesions and result in a 76 percent decrease in cervical cancer deaths for that cohort (Adams, Jasani, & Fiander, 2007).

Adolescents are an important service target population for multiple reasons. Dempsey, Koutsky, and Golden (2007) indicate that while there are certainly risk factors for HPV infection, they assert that HPV is “nearly ubiquitous among sexually

active individuals" and that individuals do not need to engage in high risk sexual behavior to become infected (p. 506). In the U.S., a third of ninth graders report having sexual intercourse and two thirds of students report doing so by the time they are seniors in high school (Hopenhayn, Christian, Christian, & Schoenberg, 2007). In connection with this, Charo (2007) points out that youth drop out rates from school begin to increase at age 13 and those youth are more likely to engage in sexual activity earlier than youth who do not leave school. Consequently, the vaccine will be most effective prior to sexual debut, which includes namely pre-adolescents and young adolescents (Markowitz, et al., 2007).

Additionally, according to Newacheck, Park, Brindis, Biehl, and Irwin (2004), older adolescents (ages 15 to 18) are at significantly higher risk for being underinsured than those ages 10 to 14 (13.7% vs. 11.0% respectively). In 2002, reportedly 12 percent of the adolescent population was underinsured (Dempsey & Davis, 2006). Uninsured adolescents may avoid health care costs and not seek vaccination. Additionally, 20 percent of adolescents living in poverty are uninsured. Even youth who do have access to preventative healthcare services often do not receive guidance or counseling from healthcare providers. Causes of this neglect include provider self-efficacy around counseling, concerns that counseling is not desired by family members, and perceptions that youth do not belong to a high-risk group (Rupp, Rosenthal, & Middleman, 2006).

Importance of Health Care Access

The prior paragraph introduces the ideas that there are access barriers related to health care services. According to Rooks and colleagues (2008), "Access to quality health care is associated with better prevention, detection, and control of chronic disease processes and consequently improved functional outcomes" (p. 600). Typically, access to health care means having a usual source of care and accessibility to that source of care through health insurance (Weinick, Zuvekas, & Cohen, 2000). In contrast, poor access to care has been discussed as relying on emergency services for care, using public or hospital-based clinics, and not using a private physician's office for care.

The notion of health disparities arose in 1984 when the secretary of the Department of Health and Human Services created a Task Force on Black and Minority Health (Weinick, Zuvekas, & Cohen, 2000). It came out of awareness that minority groups were experiencing increased health problems compared to their White counterparts. Not only have such disparities continued for health outcomes for racial and ethnic minorities, but also there are disparities in having health insurance as well as utilizing health care services. For example, Whites are more likely to have private insurance, whereas African Americans are more likely to have Medicaid. Additionally, Whites are twice as likely to have health insurance and a routine health care provider, as compared with Hispanic individuals. Both access and use of health care services are often seen as associated with demographic characteristics of individuals, such as race or ethnicity, as well as economic factors, such as sufficient

income to purchase health insurance as well as pay for medical care. Weinick, Zuvekas, and Cohen, (2000) found that while controlling for health insurance status and income level does reduce the disparities in access and use of health care services among racial and ethnic minority groups, it does not eliminate the disparities. The authors suggest that additional factors related to racial and ethnic differences are at work, such as intentional or unintentional discrimination by the provider or linguistic challenges by the provider.

Racial minority groups face structural barriers, which include residential segregation in areas with fewer medical facilities, having reduced financial resources and limited health insurance, as well as limited knowledge about innovative medical treatments (Rooks et al., 2008). Race is often linked to access to society's high quality resources. Bach, Pham, Schrag, Tate and Hargraves (2004) found that African American patients are more likely to receive services from physicians without board certification in their area of specialty as compared with their White counterparts. In connection with that, those physicians treating African American patients reported more barriers to obtaining high quality medical resources than those physicians who were treating White patients.

In addition to race and ethnicity, an individual's socioeconomic status is important in that a consequence of lower income status is having less access to health care that is affordable. Ross and Mirowsky (2000) have a "health commodity hypothesis" which posits that being in better socioeconomic standing provides

opportunities to obtain health insurance, which allows individuals to purchase health care services with more frequency and choose higher quality services (p. 292).

When considering cervical cancer incidence and mortality, it was mentioned above that there are distinct disparities present for populations from racial and ethnic minority backgrounds, as well as lower socioeconomic class. This is further seen in the utilization of Pap screenings, in which there have been lower rates of utilization for racial and ethnic minorities, as well as those with limited health insurance and financial resources (Couglin, Leadbetter, Richards, & Sabatino, 2008). Additional factors associated with screening include having a usual health care source and living in a location with increased health care providers.

The literature is consistent in its conclusion that there is a significant correlation between access to preventive and acute health care services and income, health insurance coverage, and race and ethnicity, such that having less income, less health insurance coverage, and having a minority racial background is associated with less access to care. Thus, in order to fully understand barriers to accessing cervical cancer prevention services in general and vaccinating girls against HPV in particular, it is necessary to include indicators such as health insurance status, income level, and racial and ethnic background when considering the sample as well as the research questions.

Prevention as a Social Work Intervention

Although social work once had a healthy marriage with public health, particularly around the prevention and treatment of syphilis, there has been a distinct

shift away from the public health prevention arena by the profession into clinical treatment and intervention since the 1950s (Gochros & Schultz, 1972). This has especially been the case for addressing issues relating to human sexuality, particularly for young women. Social work has periodically been conflicted as to where and how to focus efforts in addressing sexuality issues. As early as 1976, Brashear highlighted this conflict well in the following passage:

> A pervasive debate in the field has been the prevention versus the intervention stance, with sharp division frequently occurring. Such issues have tended to obscure the emergence of a specific area of expertise, such as knowledge of human sexuality. This is especially true when that knowledge and its best-known strategies are most closely identified with an educative focus, as opposed to a treatment strategy with which social work has had a major identification. (p. 4)

Despite the challenges, a mandate exists for prevention efforts. In 1987, NASW charged that social workers involved in public health efforts focus on planning and carrying out programs to prevent ill health, the use of epidemiological principles to examine the association between social factors and the prevalence of disease, and efforts to increase access to health care services (NASW, 1987). Since that time, similar directives have been given to social workers interested in healthcare services: to focus efforts on research that will impact policy and program development to better serve clients who utilize those service (Cowles, 2000).

Much of what primary prevention aims to achieve is congruent with the activities of social work research and practice. This can be seen in the five "technologies" of primary prevention, which include: 1) education; 2) social change in the community or society; 3) promotion of competency; 4) promotion of natural caregiving; and 5) consultation and collaboration (Gullotta, 1987). This study inquired about technologies #1, #2, #3, and #5. In an effort to meet the most current public health needs within the U.S., this study also incorporated two of the goals identified by the Centers for Disease Control (CDC) in its recent report entitled, "Public Health Research Needs: 2006-2015" (CDC, 2006). In this report, the CDC identified goals that aim to reduce health care access inequities and improve the quality of life of all individuals.

First, the CDC goal of Healthy People in Every Stage of Life is considered, in which individuals, particularly those at risk of health disparities, will achieve their optimal lifespan with the highest possible quality of health. This study collected data on healthcare providers providing preventative health services to consumers in four states at higher risk for future incidence and mortality from cervical cancer, namely those with increased proportions of low-income and minority women (Markowitz, et al., 2007). This study also focused on the influence of public policy, which is an essential aspect of public health, and individual healthcare provider attitudes and behaviors, who are the primary gatekeepers of access to vaccination services.

Second, this study promoted the CDC goal of Healthy People in Healthy Places, particularly for Healthy Healthcare Settings, to increase the number of

healthcare settings that provide safe, effective, and satisfying patient care. By surveying healthcare providers regarding their perceived barriers to, and supports of, HPV vaccination, implications for improving patient care as well as increasing vaccination rates were drawn.

Key Concept Definitions

As this study is focused on prevention and public health, there are important key concepts to define. The first is the term ***health care***. According to Cowles (2000), health care involves "individual and societal efforts to prevent health problems from emerging and to maintain current levels of health" (p. 13). It involves both individual and societal responsibility, the latter entailing the provision and accessibility to resources and conditions that foster individual health promoting behaviors. The second term is ***primary care***, which focuses on "the patient's first entry into the health care system" (p. 95) and which carries out public health functions of primary prevention, such as immunizations. While primary care providers are typically working with the individual, social workers who take a public health approach are looking at the community and how to affect the policies and programs that are connected with service delivery and utilization. Primary care providers are charged with providing accessible care, working in partnership with patients, and taking into consideration the unique differences found in families and communities (Cowles, 2000).

A third important term is ***health behavior***, which according to Coulton (1978), entails "behavior aimed either at the prevention of disease or at the detection

of disease in an asymptomatic state" (p. 297). This study is focused on the former part of the definition. Similar to this is the fourth term ***primary prevention***, or "the altering of susceptibility to a disease or the reduction of exposure to causal agents for susceptible individuals" (Whitman & Hennelly, 1982, p. 28). Primary prevention is tied closely with epidemiological efforts that include identifying at-risk characteristics and groups for disease, studying group rather than individual data, finding the link between risk factors and disease etiology, and finally developing interventions that change group characteristics or behaviors as well as prevent infection by altering the environment. In connection with studying group data, a fifth term is ***population-at-risk***, which includes "individuals who are both capable and likely to contract a condition, state, or disease" (p. 30). In this study, pre-adolescents and adolescents are the population-at-risk.

The Institute of Medicine (IOM) defines the sixth term, ***quality of care***, as "the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge" (IOM, 1990, p. 80). This study seeks to improve access to, and the quality of, healthcare by better understanding healthcare providers' attitudes and actions.

Finally, a seventh term is ***Vaccines for Children (VFC)***, which is a federally funded vaccine assistance program available for youth aged 18 and younger who currently receive Medicaid or who are eligible for Medicaid (Dempsey & Davis, 2006). It is also available for youth who are American Indians or Alaska natives, or

those youth who are underinsured and seek help at official VFC programs. Some state governments will allot extra money to providers in private practice to offer free vaccines for underinsured patients. According to Gudeman (2007), 27 percent of youth age 18 and under receive Medicaid benefits and 40 percent of vaccines for children are paid through the VFC program. Approximately 85 percent of pediatricians are registered to provide vaccines through the VFC program.

Current State-Level HPV Policy Initiatives

Since the release of Gardasil™, 41 states and the District of Columbia (D.C.) have initiated policies to promote the prevention of HPV and cervical cancer (National Conference of State Legislatures, 2008). Proposed policies have ranged from education and outreach about the prevalence and etiology of cervical cancer to HPV vaccination mandates for girls prior to school enrollment. Currently, 19 states have passed various policies, many of which concern providing funding for HPV education and vaccination. The most controversial policy proposed has been the vaccine mandate for school enrollment. Such a mandate typically would require all females entering a certain grade in both public and private schools to be vaccinated prior to school enrollment. Proposed school mandates have varying degrees of opt-out options for parents who may be opposed to vaccinating their children due to religious or other personal beliefs. The controversy regarding the school mandate stems around concerns of the cost of the vaccine for parents, level of funding provided by the state, as well as the safety and effectiveness of the vaccine. Additionally, arguments for parents' rights, particularly regarding a vaccine preventing a sexually transmitted

infection (STI), and moral issues have been raised. Similar to the argument against comprehensive sexuality education, groups argue that offering education and providing the HPV vaccine will promote sexual promiscuity in girls (Charo, 2007).

While 24 states and D.C. have initiated legislation that would require a vaccination mandate for school enrollment, none have been successful in passing it without either being withdrawn later or significantly delayed for a year or more (National Conference of State Legislatures, August 2008). The first most notable case was in Texas, where the governor's executive order to mandate the vaccination of girls entering sixth grade was overturned by the legislature and a bill was passed to ban any future vaccine mandate for school enrollment. The second highly publicized case was in New Mexico, where conversely, the governor vetoed a vaccination mandate of girls ages 9 to 14 for school enrollment. In October 2007, Virginia achieved approval from both the legislature and the governor to carry out a vaccination mandate for girls entering sixth grade, however the implementation was to start in October, 2008. Since then, there has been a delay in implementation, as there has been a bill proposed to remove the mandate. In August 2007, a vaccination mandate for all females in 7^{th} through 12^{th} grades was proposed in New Jersey along with a public awareness campaign and distribution of information to parents. However, the bill passed without the vaccination mandate requirement, despite language in the bill that gave parents a great deal of maneuverability for opting out of the vaccination requirement.

Educational and financial initiatives have been faring better. For example, in North Carolina, legislation passed that required an educational fact sheet be given to all parents of youth in fifth through twelfth grades. Since the release of the vaccine, 10 states have proposed policy initiatives that would urge or require some or all citizens' health insurance coverage for the HPV vaccine. In five of those states, such bills have passed, including New Mexico, which requires health insurance coverage for girls ages 9 to 14 getting vaccinated.

Other childhood vaccines, such as Measles, Mumps, and Rubella (MMR) and Hepatitis B, have become generally accepted and utilized by health providers throughout the country, particularly when vaccination mandates for school enrollment have been initiated at the state level (Rupp, Rosenthal, & Middleman, 2006). The introduction of the HPV vaccine coincides with a growing anti-vaccination movement within the U.S. over the increasing number of vaccines for children and adolescents (Wolfe, Sharp, & Lipsky, 2002). The HPV vaccine in particular has raised considerable discomfort, fear, and resistance by various groups and individuals, especially against any state policies mandating the HPV vaccine for girls' school enrollment.

For the purpose of this study, four types of state policy initiatives have been categorized[1].

[1]Given the dynamic nature of state policy, a caveat should be mentioned that the state policy initiatives were considered at the time of the start of the study. With the typical time lag that occurs from proposed legislation, to passing it, to actual implementation, it was naïvely expected that the state policy status would not change drastically during the relatively brief data collection period.

The first category includes those state policy initiatives that are aimed at increasing vaccination through educational outreach to the public. The second category includes those state policy initiatives where the aim is to provide financial support to patients who seek vaccination. The third state policy category includes those initiatives where the goal is to stop a HPV vaccine mandate for school enrollment. The final category includes those states who have not initiated any state policy initiative.

Aim of Study and Research Questions

In order to reduce the likelihood that vulnerable populations such as adolescents will experience the consequences of serious STDs, such as cervical cancer, social work must examine ways to improve access to preventive healthcare services and to collaborate with healthcare providers and public health professionals to develop ways to increase vaccination for those who do access services.

As with any new immunization, healthcare providers are the primary gatekeepers for access to vaccination (Sturm, Mays, & Zimet, 2005). Moreover, HPV vaccination is a responsibility of healthcare providers all across the nation, some of whom may practice in states that establish legislation aimed at promoting vaccination. Considering that HPV vaccination is in its infancy, it is paramount to understand the factors that are associated with HPV vaccination decisions made by healthcare providers. With the Advisory Council on Immunization Practices (ACIP) targeting girls aged 11 and 12 (Markowitz, et al., 2007), and with evidence that suggests that young people are engaging in sexual activity in early to mid-adolescence (Charo, 2007; Hopenhayn, Christian, Christian, & Schoenberg, 2007), the target population

for research becomes primary care providers who provide direct preventive services to pre-adolescent and adolescent girls.

The release of the HPV vaccine and the emergence of state policies to improve HPV vaccination rates provide a timely and important research opportunity. This study takes a population-based focus in order to promote primary prevention by understanding the variations in healthcare provider attitudes and actions, and by uncovering the connection between health care policy and actual provider practice. It examines the context in which HPV vaccination services are provided and addresses critical public health research issues, specifically studying those providers who offer services to young women who belong to low-income and minority groups. This investigation studies a variety of healthcare settings and the interaction between provider behavior, state policy, and vaccination actions. Healthcare providers who serve consumers at higher risk for health disparities are of critical importance; consequently, the target population provides services to a large contingency of minority populations, including Latina, Native American, African American, and low-income women.

Main Research Questions

A) Are providers' HPV vaccination rates higher for girls aged 13 to 17 compared with girls aged 9 to 12 in each state?

Hypothesis: Providers' vaccination rates will be significantly higher for girls aged 13 to 17 than for girls aged 9 to 12 in all four states.

B) Is type of state policy initiative associated with varying providers' HPV vaccination rates for girls ages 9 to 12 and girls 13 to 17?

Hypothesis: Providers' HPV vaccination rates will differ significantly for both age groups, with states that mandate health insurance coverage for the vaccine having the highest rates and those with no policy initiative the lowest.

C) What is the nature of the relationship between indicators of health care access and vaccination rates in both age groups?

Use of private insurance and belonging to a non-minority racial background will be predictive of higher provider HPV vaccination rates in both age groups.

D) What do healthcare providers identify as the most common barriers, supports, and HPV vaccination actions? Of the most common barriers and supports, which are reported as having the most impact on HPV vaccination actions?

Hypothesis: The most common barriers will include the financial burden to the patient and concerns about negative perceptions of patients about the HPV vaccine. The most common supports will include believing the HPV vaccine will improve women's lives, the state policy initiative, and the professional adherence to CDC recommendations. The most common actions will include counseling parents and seeking more information about the HPV vaccine. The

financial burden will be reported as the most influential burden and the policy initiative will be the most influential support.

E) Which combination of predictors, including type of state-initiated HPV vaccine policy, type of healthcare provider, and the vaccine barriers and supports perceived by healthcare providers, is most predictive of healthcare providers' HPV vaccinations of girls aged 9 to 12 and girls aged 13 to 17? Is it the same combination for both age groups?

Hypothesis: Provider's HPV vaccination rates of girls aged 9 to 12 will be higher in New Mexico, where there is mandated health insurance coverage for girls 9-14 who are vaccinated, among nurse practitioners and physician assistants, and among those with fewer perceived barriers and more perceived supports of HPV vaccinations. Provider's HPV vaccination rates of girls aged 13 to 17 will be higher in New Mexico, among pediatricians and family physicians, and among those with fewer perceived barriers and more perceived supports of HPV vaccinations.

Results are directly relevant to consumers, providers, administrators, state/local health departments and policy makers. The study provides pertinent information that may provide insight to states considering HPV policy initiatives, as well as healthcare organizations and providers who are interested in enhancing service delivery for patients interested in obtaining the HPV vaccination, and finally to healthcare social workers who work closely with providers and patients.

Chapter 2: Guiding Theory

This study relies on theory to provide a foundation for guiding the development of the research questions and approach. A public health framework as well as the theory of planned behavior is utilized to inform the development of the study, both of which are embedded within a social welfare context.

Positioning this Research within a Social Welfare Context

This research is grounded in a social welfare context that draws from a systems framework.

Using a Social Welfare Systems Framework

Much of social work uses a systems framework to understand social problems and to engage in social work interventions. On the continuum of social work arenas, human systems are connected in complex ways and need to be considered as a whole greater than the sum of its parts (Robbins, Chatterjee & Canda, 2006). In this view, individuals within society are constantly interacting with the outside environment, which creates the need for continuous adaptation from both individuals and the environment. In the context of this study, it is imperative to consider the influence and connection between the major actors in the system that that is being researched. This includes understanding the service target populations (i.e. young female patients and their parents), as well as those aspects within the environment that are interdependent with the service target populations (i.e., state policy, healthcare providers and the organizations that employ providers).

Within this framework, the ecological perspective enhances this understanding by recognizing the potential fluidity and level of fit between the environment and individuals (Germain, 1979). As social workers, we aim to enhance this fit between these two systems, so that both systems can adapt and shape one another, which leads to increased functionality. From this perspective, there are many opportunities for both systems to grow and reach their full potential. In this study, gaining an understanding for the "goodness of fit" during a time in which the systems (i.e. state policy and healthcare providers) may be undergoing a period of adaptation to the entrance of the new vaccine is paramount. Introduction of the HPV vaccine may create stress in the systems, particularly if there are incongruities between the needs and competencies within these systems.

Shulman (1999) indicates that all social work models help to understand individuals and their environments. The author utilizes an interactional model, which has three core concepts. The first is the symbiotic relationship between individuals and their social worlds. The second is that obstacles routinely block the mutual need that exists between these actors, and the third concept is that both the individuals and their environments have strengths that can be capitalized upon to improve functioning. Using this model in the context of this research, the symbiotic relationship exists between state healthcare policies, healthcare organizations, their healthcare providers and their patients. All of these systems need one another in order to function well, however at times, barriers may inhibit their successful interaction. In

order to have a thriving relationship, strengths and supports within these systems must be identified.

In a similar vein, Sheafor and Horejsi (2006) assert that an essential role of social work is to enhance social functioning, which they define as "a person's ability to accomplish those tasks and activities necessary to meet his or her basic needs and perform his or her major social roles…" (p. 5). This study considers the current social functioning of healthcare providers in their social roles as gatekeepers to vulnerable patients needing medical counseling and services. Additionally, the goal of enhancing the social functioning for patients is directly linked to this study in considering the importance of patients' access to medical care. One way to increase social functioning is to provide social care, which includes "actions and efforts designed to provide people in need with access to the basics of life…and opportunities to meet their psychosocial needs…" (p. 5). As social workers, we recognize that vulnerable populations, such as adolescents, need access to preventive healthcare services that have the potential to respond to their needs and maximize the length and quality of their lives. Identifying potential areas in which the environment can be modified to improve social functioning of the major actors is key. Patients' immediate environment can affect social functioning; for this study, the immediate environment includes the healthcare system they access and the healthcare providers with whom they interact. The distant environment includes the state policies that are being implemented to support HPV vaccination; while this environment is broader in nature, it still may play a direct role in patients' social functioning.

The systems framework highlights social workers' practice within varying levels of systems, ranging from the micro to the macro level. This study is a form of social work macro practice, which Netting, Kettner, and McMurtry (2004) define as "professionally guided intervention designed to bring about planned change in organizations and communities" (p. 4). They assert that some problem areas require change to occur within the context of services provided, the programs providing the services, or the policies that influence the programs and services. When conducting macro practice, the authors assert that social workers must understand the problem, the population, and the arena (i.e. organizations and communities); it is where these areas overlap that is most important. The larger system, including the political and policy context, is also considered. This research looks at the problem (i.e. HPV), the service target population (i.e., adolescents and their parents), and the arena (i.e. healthcare providers), while considering the role of the policy context (i.e., current social policy initiatives).

Using a Public Health Framework in the Social Welfare Context

Understanding the various systems that interact within this study is enhanced when they are put into a public health framework. Interventions can occur at three points: 1) prior to the development of a problem, 2) when the problem is occurring, or 3) after the problem has occurred. When efforts are focused primarily on prevention during these three phases, the social work interventions are then referred to as primary, secondary, and tertiary prevention. In discussing prevention, Sheafor and Horejsi (2006) write:

> Many prevention efforts by social workers are concerned with improving the way people relate to and utilize available health and human services provided by the organizations that make up the social welfare and health care systems. At the same time, prevention efforts attempt to improve people's access to these often complex, legalistic, and highly bureaucratic services and to enhance the quality of services obtained when one has access to them. (p. 8)

Each phase requires a different understanding of the systems involved and the goals of change. For this study, primary prevention has been selected as the necessary intervention; a public health framework focuses on primary prevention and provides useful guidance in developing the research.

Epidemiology is the study of the cause of disease infection, and thus, how to control it. According to Whitman and Hennelly (1982), the epidemiologic triangle is a basic causal model that illustrates the three factors involved in the manifestation of disease. These factors include the agent (e.g., HPV), the host (e.g., individual), and the environment (e.g., lack of education, lack of access to health care, concerns about talking with health provider, etc.). As gatekeepers to preventive health services, healthcare providers are an essential aspect of the environment. The social context that influences the decisions of healthcare providers and their service delivery to patients is considered paramount.

An epidemiological health services research perspective identifies healthcare providers as a key component of the delivery of health services, playing a crucial role in the health status of patients (Oleske, 2001). Healthcare providers must take into

account the demographics, lifestyle, physical, social and economic environment of their patients. Additionally, healthcare providers must be able to recognize patient need and ability to utilize healthcare services. Providers' perceptions of patient need are influenced by health information (e.g., the dissemination of practice guidelines) as well as diagnostic or treatment utilization restrictions imposed by health insurer or institutional policies. Patients' ability to utilize healthcare services are influenced by healthcare provider accessibility, availability, knowledge, attitude and beliefs, which is the subject of this study.

A public health perspective informs the importance of focusing on state policy as a central piece of this study. Wallack (1997) asserts that public health is the result of the interaction between various social arenas, such as economics, policies, communities, research and social movements. With the increasing shift of health policymaking to the states, it is likely that regional ideology, interest groups, and party control will have some impact on the creation and implementation of public policy (Shannon, 2001). This interaction between party and morality politics with public health goals has already begun with the deluge of state policy initiatives seen across the nation. It is within this social milieu that the study will occur, emphasizing the overarching goal of identifying policies that are most effective in promoting the population's health.

This study is also informed by the public health objectives set forth by federal government. In 1999, the US Public Health Service's Core Public Health Functions Steering Commitment established Ten Essential Public Health Services, five of which

guide this study, namely to 1) inform, educate, and empower people about health issues; 2) mobilize community partnerships and action to identify and solve problems; 3) assure a competent public health and personal healthcare workforce; 4) evaluate effectiveness, accessibility, and quality of personal and population-based health services; and 5) search for new insights and innovative solutions to health problems (Shannon, 2001).

The final public health perspective guiding this study is the consideration of the process that occurs when a new vaccine is introduced into the public. According to Matuszewski and Vermeulen (1994), there are five stages of a new technology's life cycle: Phase 1: Investigation, Phase 2: Promotion, Phase 3: Acceptance and Utilization, Phase 4: Decline, and Phase 5: Obsolescence (as cited in Matuszewski, 2001). In this case, the new technology is the HPV vaccine and this study will examine the outcomes of the first three phases, which will provide important information to stakeholders seeking to improve public health policy and maximize access to care among underserved populations.

Using Social Psychology within the Social Welfare Context

The social behavior of primary care providers as it relates to the vaccination of girls against HPV is vital because of the interaction between the various systems described above. Social psychology provides a foundation from which to understand what drives social behavior, particularly when it is connected with individuals engaging in health behavior or those individuals acting in ways that will promote the health of others. For both a provider and patient perspective, it is important to

consider the motivation behind health behavior as it relates to prevention of STDs. Fishbein and Guinan (1996) state this clearly in the following passage:

> Rather than basing a behavior change intervention upon possibly invalid or incorrect assumptions about behavior, scientists, clinicians, and public health workers should take advantage of the information that is currently available about behavior and its determinants…Clearly, the more one understands the factors influencing (or underlying) a person's decision to perform (or not perform) a given behavior, the more likely one is to develop interventions that can effectively change that behavior. (p. 6)

One theory that clearly delineates the process involved in individual decision-making is the Theory of Planned Behavior. It is the main substantive theory that provides a foundation for this study.

Theory of Planned Behavior

The Theory of Planned Behavior (TPB) has been repeatedly used in psychology and nursing to predict a variety of health behaviors, such as individual contraceptive use (Bryan, Fisher, & Fisher, 2002; Fazekas, Senn, & Ledgerwood, 2001; Koniak-Griffin, Lesser, Uman, & Nyamathi, 2003; Reinecke, Schmidt, & Ajzen, 1996; Rye, Fisher, & Fisher, 2001; Villarruel, Jemmott, Jemmott, & Ronis, 2004). Social work has also drawn from the TPB to predict a number of other behaviors. These include adolescent smoking (Maher & Rickwood, 1997); older adults' participation in exercise (Bocksnick, 2004); adolescent gambling behavior (Wood & Griffiths, 2004); and academic success in African American youth (Davis,

Johnson, Cribbs & Saunders, 2002). Recently, the TPB has been used to guide survey development in studies exploring HPV vaccine acceptability by pediatricians (Kahn et al., 2005); however, it has not been widely used elsewhere in the HPV literature.

The TPB is a direct extension of the Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1975). Both theories focus on predicting an individual's behavioral intentions, which are viewed as the immediate antecedents to actual behavior (Ajzen, 1985). The TPB accounts for the lack of complete volitional control an individual may have over the behavior in question (e.g., vaccination of girl against HPV). According to Ajzen, intentions are the "…indications of how hard people are willing to try…in order to perform the behavior" (1991, p. 181). A general proposition of the theory is that the stronger the behavioral intention, the greater the chance that the behavior will actually be carried out.

The TPB states that there are three antecedents to an individual's behavioral intentions: personal attitudes, subjective norms, and perceived behavioral control (Ajzen, 1991). Personal attitudes develop out of an individual's behavioral beliefs and are described as the "…degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question" (Ajzen, 1991, p. 188). Subjective norms are comprised of a person's normative beliefs and are defined as "…the perceived social pressure to perform or not to perform the behavior" (p. 188). Perceived behavioral control forms out of an individual's control beliefs and refers to the "…perceived ease or difficulty of performing the behavior and it is assumed to reflect past experience as well as anticipated impediments and obstacles" (Ajzen,

1991, p. 188). Ajzen likens perceived behavioral control to Bandura's (1986) principle of self-efficacy. This construct can also act as a proxy for "actual" control, which allows it to influence behaviors independently from behavioral intentions. Ajzen (1991) indicates that personal attitudes, subjective norms, and perceived behavioral control will have varying influence depending on the behavior and situation.

Strengths of the Theory of Planned Behavior

First, the TPB has been successful in predicting behavioral intentions towards a variety of behaviors. Second, Ajzen (1991) stated that salient beliefs must be understood according to the population and context in question. It is reasonable to posit that salient beliefs of primary care providers are unique and warrant attention. Third, the TPB is parsimonious (Sutton, 1998), which allows it to be accessible to a wide audience, as well as easily utilized within a new context, such as HPV vaccination.

Limitations of the Theory of Planned Behavior

The primary limitation of the TPB is its assumption of rational behavior. Ajzen indicates that individuals will use available information to make informed decisions (Ajzen & Fishbein, 1980). This assertion is based on a male-oriented, individualistic standard of what defines "rational" behavior. It does not consider specific gender or cultural differences that could alter what "rational" behavior means for minority healthcare providers or for understanding the behavior of minority patients. While the TPB considers the influence of referent groups on subjective

norms, ultimately an individual will only be affected to the extent to which the individual is motivated to comply with that referent group (e.g., such as other pediatricians) or individual (e.g., a patient) (Ajzen & Fishbein, 1972). This leaves possible conflicts in decision-making when normative beliefs from referent groups or individuals disagree (e.g., a nurse practitioner who follows ACIP recommendations but has a parent with a strong religious concerns about HPV vaccination or mistrust of vaccinations).

Considering the Theory of Planned Behavior to Inform the Research

The primary components of the TPB are used to inform the basis for this study. The central premise that a primary care provider's perceived barriers and supports, which stem from personal or normative beliefs, or perception of perceived behavioral control, leads to planned behavior is the foundation for the survey that has been developed for this study. While this initial study is looking at associations rather than causation, by understanding which barriers and supports are most frequently reported in relation to personal and normative beliefs, it will be feasible for future studies to test the extent to which the constructs of the TPB account for HPV vaccination behavior.

Chapter 3: Review of the Literature

The Role of Barriers and Supports in Social Work Research

The social work literature shows the essential link between barriers and supports within primary prevention. According to Coulton (1978), as supports are enhanced and barriers are reduced, preventive health behavior will increase. Specifically, she indicates that, "…planning for social work intervention should start with an assessment of the supports and barriers characteristics of given patients or target populations and *their environments*" (emphasis added) (p. 306). The barriers in the environment include the personal and professional barriers identified by primary care providers. These can include both personal or psychological barriers, such as fear and embarrassment and concerns about patient perceptions, as well as structural barriers to service provision, such as lack of information or financial constraints (Cowles, 2000).

Similarly, the supports of the environment include the personal, social, and professional supports enjoyed by primary care providers. Coulton (1978) writes that social supports are a "powerful determinant of health" (p. 101) and as such, primary care providers can be considered as a source of social support for patients and family members when they provide the needed information, counseling, and resources to families in an informed, open, and supportive manner.

By understanding the barriers and supports faced by primary care providers as they relate to HPV vaccination in girls aged 9 to 12 and 13 to 17, specific

recommendations for interventions aimed at improving service delivery and utilization can be made in the future. Given the limited research on actions, it is unknown how the perceived barriers and supports of healthcare providers will influence their behaviors and in what directions those relationships will take, thus forming the basis of this investigation.

Barriers and Supports Related To HPV Vaccination

Given that trials for the HPV vaccine started in the 1990s, there is a finite amount of literature on this specific topic. In 2008, the first literature on actual vaccination rates started to appear; there have been two articles of this nature thus far. The majority of the literature, prior to 2008, has focused on the examination of attitudes, beliefs, and intentions regarding the HPV vaccine in hypothetical situations of vaccinating. The studies typically focused on healthcare providers, mothers of young girls, and women. From these studies, expected barriers, supports and intentions related to HPV vaccination were revealed. While the proposed study examined the current vaccination behaviors of providers, perceptions of current barriers and supports were also a key aspect of the research.

Barriers Related to HPV Vaccination

There are a variety of different forms of barriers discussed in the literature. They have been separated into their common categories in this section. All of the categories discussed below have been reported in the strongest studies. Frequently reported barriers in less rigorous studies include financial barriers and informational barriers.

Informational Barriers

Lack of information/education has been discussed as a barrier to HPV vaccination, for young women, mothers of adolescent girls, as well as primary care providers, namely family physicians, pediatricians and nurse practitioners (Chan, Cheung, Lo, & Chung, 2007; Hoover, Carfioli, & Moench, 2000; Lazcano-Ponce, et al., 2001; Mays, Sturm & Zimet, 2004; Olshen, Woods, Austin, Luskin, & Bauchner, 2005; Tedeschi, et al., 2006; Woodhall, et al., 2007; & Zimet, et al., 2000). Studies commonly revealed that parents and young women often are unfamiliar with the risks of contracting HPV or with its direct connection to cervical cancer. For example, in one of the more rigorous studies that used a cross-sectional telephone survey that included 2,000 women and men in Southern Australia, only two percent of the sample knew the etiology of cervical cancer (Marshall, Ryan, Roberton, & Baghurst, 2007). In a smaller study in the Netherlands, only one third of parents (N = 356) of 10 to 12 year old children had heard of HPV and less than 15 percent were aware of the connection between HPV and cervical cancer (Lenselink, et al., 2008). Lack of information may also inhibit providers as well. In a much smaller study with 37 primary care providers in New Mexico, Sussman, et al. (2007) found that barriers to counseling parents on HPV vaccination included limited knowledge of HPV and the low levels of knowledge by adolescents. As such, most studies provided participants with some form of brief educational intervention such as an informational sheet or pamphlet, which typically enhanced willingness to get vaccinated. Throughout the

literature, researchers recommended continued educational outreach and interventions for parents, women, and healthcare providers.

Safety and Efficacy Barriers

There have been concerns by parents, young women, and primary care providers about issues of vaccine safety and efficacy. In a recent study from the Netherlands, 1367 women randomly surveyed indicated concerns about both long-term safety and effectiveness of the HPV vaccine as barriers to vaccination (Korfage, Essink-Bot, Daamen, Mols, & van Ballegooijen, 2008). In another strong study that included 513 pediatricians using a mail survey, pediatricians reported concerns about the safety of the vaccine and uncertainty regarding the efficacy of the vaccine in terms of its length of protection for individuals (Kahn, et al., 2005). Part of this uncertainty may be related to lack of up-to-date information, as one five-year longitudinal study showed that Gardasil™ is effective for at least five years, perhaps even longer (Gudeman, 2007). Though not found in an actual research study, the lack of full protection provided by the vaccine for other types of HPV beyond four types/strains—which are responsible for 70 percent of cervical cancer cases and 90 percent of genital warts cases –has been noted by primary care providers (Dempsey & Davis, 2006). In an editorial piece, Gostin and DeAngelis (2007) assert that healthcare providers should be concerned about the lack of efficacy trials for girls aged 9 to 15 and recommend more trials before mandating the vaccine for school enrollment. Additional concerns by parents and young women focused on potential side effects from the vaccine and general safety of the vaccine (Gerend, Lee, &

Shepherd, 2007; Marshall, Ryan, Roberton, & Baghurst, 2007; Woodhall, et al., 2007).

Cultural Barriers

Potential cultural barriers discussed in the literature have focused on race, ethnicity, socioeconomic status, education level and health insurance status (Sussman, et al., 2007). In a recent study that conducted a series of focus groups with 54 Hispanic women in New Mexico, participants indicated that providers should consider relevant cultural issues related to HPV infection and the importance of the vaccine (Vanslyke, et al., 2008). Such issues included understanding that Hispanic men may put their partners at heightened risk for HPV due to the cultural tolerance of refusing to wear condoms and by engaging in sexual activities outside of their intimate relationship. In a qualitative study with 31 pediatricians, Tissot, et al. (2007) found that pediatricians had concerns about parents' anti-vaccination beliefs, particularly for those parents who have strong religious beliefs or those who believe in holistic approaches to healing, as well as different racial/ethnic groups such as Latino, Asian, and Indian populations. Further, African Americans were considered less trusting of medical providers and vaccines. Socioeconomic factors were also brought up, indicating that less education and income might decrease parental ability (i.e., access to care) to seek vaccine but that those with higher income and education may not see their children as vulnerable. Issues of higher income and lower education status were also found to be barriers to intentions in other studies as well, in which having a high income for parents was a perceived barrier to vaccination and low

education was a barrier for youth (Hopenhayn, Christian, Christian, & Schoenberg, 2007; Woodhall, et al., 2007).

Psychological Barriers

Psychological barriers include personal concerns or discomfort with HPV vaccination. These barriers fall into two major categories: 1) concerns by primary care providers about the attitudes of parents due to the vaccine preventing an STI, and getting parental consent (Dempsey & Davis, 2006; Kahn, et al., 2005; Sussman, et al., 2007); and 2) the concern by parents and young women that HPV vaccination would encourage promiscuity or that there was little personal risk of HPV infection for themselves or their adolescents (Marshall, Ryan, Roberton, & Baghurst, 2007; Woodhall, et al., 2007).

Financial Barriers

Gardasil ™ is the most expensive vaccine that is recommended for children and adolescents—selling for $360 as compared with under $50 for other recommended vaccines (Gudeman, 2007). It is not surprising then, that concerns about the financial burden of the vaccine have been brought up in the literature. Women report that having health insurance may not necessarily make the vaccine affordable if their health insurance company does not cover the vaccine either fully or partially (Hopenhayn, Christian, Christian, & Schoenberg, 2007). This sentiment is affirmed in a recent article with a sample of low-income women, which found that out of 409 women, only 42 percent indicated that they could afford the vaccine (Kahn et al., 2008).

Additionally, concerns about the constraints of the Vaccines for Children (VFC) program have arisen. There is considerable financial burden for primary care providers purchasing the vaccine at full cost for those who do not qualify for the VFC program, as well as for those providers who are not officially registered as a VFC site (Dempsey & Davis, 2006). Providers are taking a financial risk by purchasing the vaccine for private insurance patients, as their patients may not choose to be vaccinated because of the remaining financial burden. Providers may not recoup their investment if insurance companies only reimburse for the vaccine itself, and not for administrative and storage costs. As a result, some providers are reportedly keeping their vaccine supply low as a cautionary measure and only offering to those patients whose coverage will provide greater reimbursement (Gudeman, 2007).

Further barriers exist for underinsured and privately insured youth. Gudeman (2007) asserts that while the VFC program offers relief to underinsured adolescents, there is limited access to the VFC discounts due to the lack of presence of Federally Qualified Health Centers (FQHC) or a Rural Health Clinics (RHC) in some geographic areas. Additionally, VFC benefits are not available to privately insured youth. Private insurance has typically been a source of support for patients in deferring vaccine costs; almost half of the recommended vaccines are normally covered by insurance companies. For those individuals whose health insurance plans do not provide coverage or have large deductibles, patients will face a financial burden. As such, policy aimed at increasing vaccination by requiring health insurance

companies to cover the vaccine will not be effective unless providers can reduce the initial cost to purchase the vaccine (Gudeman, 2007).

Compliance Barriers

Unlike many vaccines that only require one shot, Gardasil™ requires a three-dose series, at zero, two, and six months (McIntosh, Sturpe, & Khanna, 2008). This may present a compliance challenge, particularly for vulnerable populations who have limited transportation and ability to take off work repeatedly (Herzog, Huh, Downs, Smith, & Monk, 2008). Requiring three visits can place an added burden on both the patient and the physician in terms of scheduling, availability, as well as limits placed on the number of visits covered for adolescent well-visits (McIntosh et al., 2008). Getting to the providers' office may not be the only compliance challenge. Brabin and colleagues (2008) found adherence to be a barrier even when the vaccine was provided within the school setting, as students commonly missed their scheduled appointments to receive the first and second doses (16 and 24 percent, respectively); the 3rd dose was not discussed in this study, but it is reasonable to expect missed appointments given the pattern for the first two doses.

Supports Related to HPV Vaccination

Similar to barriers, there have been recurring supports mentioned in the literature as potentially enhancing HPV vaccination. There is less knowledge about the types of supports that would aid HPV vaccination. In the most rigorous studies, financial supports, health behavior, and state policy supports were reported as

perceived supports. Other supports reported in less rigorous studies included physician recommendations and organizational supports.

Financial Supports

As discussed earlier, the financial burden of the HPV vaccine has been a concern and thus providing financial support to primary care providers and patients is important. Providers, women, and parents have indicated that having the vaccine covered fully by insurance is key, as is making it affordable for those without insurance (Hoover, Carfioli, & Moench, 2000; Fazekas, Brewer, & Smith, 2008; Kahn, et al., 2005; Tedeschi, et al., 2006; Zimet, et al., 2000). According to Gudeman (2007) other forms of financial support may be capitalized upon, as 15 states provide universal vaccine coverage for required vaccines for all children, regardless of insurance or VFC status. States can use also federal CDC money to pay for underinsured patients to cover vaccine costs under Section 317 of the Vaccination Assistance Act of 1962 (Rein, Honeycutt, Rojas-Smith, & Hersey, 2006), which is given to support local and state vaccine programs. Interestingly, in a random-digit phone survey of over 600 women in Kentucky, having less income was seen as an aid to vaccination, perhaps because of their access to VFC programs (Hopenhayn, Christian, Christian, & Schoenberg, 2007).

Though less rigorous, in one study utilizing a convenience sample drawn from a rural area of North Carolina, 146 women reported that they would be willing to pay on average a $178 of out-of-pocket cost for their daughters to get vaccinated (Fazekas, Brewer, & Smith, 2008). In the Netherlands, having the vaccine offered

free of charge through a national vaccination program was reported as a support in the sample of 356 parents of children aged 10 to 12 years (Lenselink, et al., 2008). In a less rigorous study that used qualitative methods with 34 parents, lower formal educational levels, which is typically associated with the use of public funding, also was associated with positive vaccination intentions (Mays, Sturm, & Zimet, 2004).

Organizational Supports

A variety of organizational supports, meaning supports provided by primary care settings such as clinics and private practices, have been discussed. Creating office supports, such as decreasing time constraints when visiting patients and providing necessary information/education to providers, has been discussed by primary care providers (Chan, Cheung, Lo, & Chung, 2007; Sussman, et al., 2007).

In the small qualitative study with 31 pediatricians by Tissot, et al. (2007), potential supports for improving delivery of the HPV vaccine were discussed in depth. These supports included: 1) increasing feasibility of vaccine administration; 2) creating office protocols for increasing vaccination; 3) increasing access to the vaccine; 4) getting influential organizations to endorse the vaccine; and 5) providing education to providers, parents, and youth. Specific supports included provided lectures and written materials, such as informational sheets and professional organization policy sheets; local expert guest speakers, web sites with information and recommendations, data on HPV prevalence, susceptibility for patients, HPV-related diseases and health impact; and also strategies for talking with parents and youth in a culturally sensitive way, such as providing scenarios and scripts. Also,

providing written material in the office, educational videos and web-based information for parents and youth were identified as potentially supportive.

Provider Encouragement and Recommendation as a Support

Primary care providers are typically seen as gatekeepers to health care services. One of the main reasons for this is the continued response by patients and their family members that having a provider recommend a particular service is influential in actually obtaining that service. HPV vaccine acceptability by parents and young women has been higher when they perceive that their health provider recommends the vaccine (Gerend, Lee, & Shepherd, 2007; Hoover, Carfioli, & Moench, 2000; Tedeschi, et al., 2006; Zimet, et al., 2000).

Additionally, not only the recommendation, but also counseling by providers to patients and their families is seen as supportive of vaccination intentions (Adams, Jasani, & Fiander, 2007). Sussman, et al. (2007) found four factors to be important in the counseling process: 1) the importance of rapport building with adolescents; 2) the assumption that adolescents will engage in high-risk behaviors; 3) the difficulty and complexity of counseling about the HPV vaccine; and 4) the attitudes of primary care providers, nurse practitioners, and community acceptance of the HPV vaccine.

State Policy Supports

Given the past successes of mandating other major immunizations, such as Hepatitis B and Measles, Mumps, and Rubella (MMR), it is expected that primary care providers will have informed attitudes regarding the utilization of state HPV vaccination mandates for school enrollment. In the rigorous study with pediatricians

(Kahn, et al., 2005), discussed in the barriers section, mandating the HPV vaccine for school registration was considered to be essential for increased vaccination of youth. Tissot, et al. (2007) found that out of 31 pediatricians, most recommended a universal vaccine over a targeted vaccine. Interestingly, one third supported a vaccination mandate for school enrollment, one third disagreed with a mandate, and the other third were undecided but believed a mandate was not likely to occur.

Health Behavior as a Support

Some interesting past and current health behaviors have also been found to be potentially supportive of HPV vaccination. In a randomized study of 880 Mexican women completing in-person surveys, having multiple partners was reported as an aid to HPV vaccination (Lazcano-Ponce, et al., 2001). Gerend, Lee, and Shepherd (2007) found that underserved low-income women perceived prior HIV testing as a support for future vaccination against HPV. The authors speculated that prior preventive health behavior would be a supportive function of future behavior as well as an increased knowledge base about STD's and STI's in general. Additionally, present health concerns may be indicative of vaccine acceptability. Hopenhayn, Christian, Christian, and Schoenberg (2007) found that women who smoked were more in favor of vaccination than those who did not smoke. The authors attributed this finding to the increased risk factor for cervical cancer that exists for smokers. In a similar vein, in a study surveying a random sample of 1,350 Canadian parents of children aged 8 to 18 years old, knowing a friend or relative who was perceived as being at risk for

cervical cancer was viewed as a support of vaccination for parents (Ogilvie et al., 2008).

Initial HPV Vaccination Rates

As stated earlier, articles describing actual HPV vaccination rates within the U.S. and abroad have only just begun to be published. As a general statement on vaccination, the Advisory Committee on Immunization Practices (ACIP) has reported that since March 2007, nearly five million doses of the HPV vaccine have been given in the U.S. (Herzog, Huh, Downs, Smith, & Monk, 2008). The Advisory Committee on Immunization Practices (ACIP) has broken this down into two age groups; they report that 75 percent of those doses have gone to those aged 9 to 17, with the remaining 25 percent going to those 18 to 26 years old. However, ACIP did not partition it down further within the 9 to 17 age group, which would be particularly important for this study.

On a smaller scale, there have been two studies reporting initial vaccination rates by patients. One was completed in England, where 36 secondary schools were offered the opportunity to have 12 and 13 year old girls vaccinated against HPV. The physicians used Cervarix™, which is the bivalent vaccine used currently in Europe, as opposed to Gardasil™, which is the quadvialent vaccine used in the U.S. (Brabin et al., 2008). Within the school setting, primary care physicians administered the vaccine the three doses at zero, one, and six months, which is the standard protocol for giving Cervarix™ . In this study, 2817 girls were offered the vaccine; from this sample, 70 percent completed both the first and second doses of the series. The

vaccination uptake for the third dose was not reported, which is important given that the effectiveness of the vaccine is only assured when all three doses are administered. Interestingly, there were significantly lower vaccination rates at those schools that either had greater percentages of ethnic minority students or had higher percentages of students eligible to receive free meals.

The second article focused on a sample of low-income young women ages 13 to 26 who were accessing services at three primary care clinics (Kahn et al., 2008). They sampled 409 sexually experienced females who completed a survey that asked for a self-report of HPV vaccination among other questions, as well as a DNA test for HPV strains. Of those approached, 98 percent participated in the study. Only 5 percent of the sample reported receiving the first dose of the vaccine and less than 1 percent had received the entire series. The authors reported that low vaccination rates may have been due to multiple factors, including the health department not offering the vaccine until after the study began, limited financial benefit for clinics to offer the vaccine to low-income women, and perceived and actual barriers for both patients and organizations. The study did not look at a comparison group of pre-adolescent, non-sexually experienced girls accessing primary care services, which would have been useful for this research.

Intentions Related to HPV Vaccination

Throughout the literature, intentions to vaccinate against HPV have been quite high regardless of being a provider, a parent, or a young woman (Hopenhayn, Christian, Christian, & Schoenberg, 2007; Marshall, Ryan, Roberton, & Baghurst,

2007). In a survey completed by 400 adolescents and 740 parents, 83 percent and 86 percent favored HPV vaccination respectively (Woodhall et al., 2007). However, those intentions have been markedly lower when considering vaccination for younger girls. For providers, family physicians, nurse practitioners, and pediatricians typically supported vaccination for older adolescents compared to their younger counterparts (Mays & Zimet, 2004; Riedesel et al., 2005). In surveying 513 pediatricians, Kahn, et al. (2005) found that while most thought that youth between 9 and 13 should be targeted for the vaccine, more were likely to recommend the vaccine for those older than 13 years old.

The same pattern has been found with mothers and young women. While a majority are interested in the vaccine for their daughters or themselves, the age of a child being vaccinated is an important consideration (Fazekas, Brewer, & Smith, 2008; Hopenhayn, Christian, Christian, & Schoenberg, 2007; Mays, Sturm & Zimet, 2004; Olshen, Woods, Austin, Luskin, & Bauchner, 2005). For example, Fazekas and colleagues (2008) found that from 146 parents in a rural North Carolina region, there were lower levels of intentions to vaccinate if the child was between the ages of 11 to 16 (38 percent) versus 17 to 25 (43 percent). Intentions for vaccinating girls age nine and ten years old were not discussed. In the only study that had 100 percent of low-income women expressing acceptability towards getting their child vaccinated, the researchers who surveyed the 58 women did not ask if the age of the child influenced their intentions (Gerend, Lee, & Shepherd, 2007).

Internationally, there have been both positive and negative reactions by parents to vaccinating pre-adolescents. Two articles in the Netherlands show positive intentions to vaccinate pre-adolescent girls ages 10 to 12 years in age (Korfage, Essink-Bot, Daamen, Mols, & van Ballegooijen, 2008; Lenselink et al., 2008). The more rigorous of the two, which sampled 1367 women, reported that on average, 78 percent of the women would vaccinate their 10-year-old daughter or granddaughter. In the other study, of 356 parents of 10 to 12 year olds, almost 90 percent reported favorable intentions to vaccinate their daughters if the vaccine was provided at no cost through the government. This connection between high intentions to vaccinate girls through a free government program was also found in a recent study done in a random sample in Canada with 1350 parents of children ages 8 to 18 years of age (Ogilvie et al., 2008). From the sample, over 70 percent of parents indicated a positive intention to have their daughters vaccinated in such a context.

On the negative side, in a study surveying 170 mothers in Hong Kong, parents most frequently reported support for vaccinating girls in ninth grade or above, as compared with a little less than one fourth of the mothers supporting vaccination of girls in sixth grade (Chan, Cheung, Lo & Chung, 2007). This may be a reflection of differing social norms and values between these cultures around sexual behaviors. This idea is supported by Widmer, Treas, and Newcomb (1998), who examined national survey data from 24 countries on attitudes about sexual behaviors and found that both the Netherlands and Canada report greater acceptance of premarital sex in comparison to Japan and the Philippines.

Future Directions for Research

The literature reviewed indicates that the knowledge of perceived barriers is grounded in more rigorous research than that for supports. Several categories of perceived barriers have been reported in studies with large samples of surveyed healthcare providers, mothers, and young women. These barriers include informational barriers, safety and efficacy barriers, financial barriers, cultural barriers, and psychological barriers. Less is known about perceived supports, though survey research suggests that financial supports, health behaviors, and state supports are important aids to vaccination, but less is known about physician recommendation supports and organizational supports. While the literature regarding intentions is consistent in both strong and weak studies, the main weakness within this area is that a majority of the studies focus on intentions rather than actions. The next logical step in this field of research is to capture behaviors.

This study is also informed by a recent review article that provides recommendations for future HPV research (Zimet, Liddon, Rosenthal, Lazcano-Ponce, & Allen, 2006). The authors indicated that the studies carried out thus far have struggled with various limitations, including low sample sizes and response rates, convenience samples, an inconsistent use of theory, and hypothetical scenarios. Consequently, it is essential to look at primary care providers' current perceptions of barriers and supports now that the vaccine has been on the market for over two years and with the influx of new state policies aimed at promoting vaccination. Moreover, while most of the literature written both prior and now after the release of the HPV

vaccine is focused on intentions, it is important to examine the actual behaviors of healthcare providers regarding HPV vaccination, particularly for pre-adolescent and adolescent girls. By taking this approach, this study goes beyond prior attitudinal research by specifying the actual perceived barriers, supports, and behavioral actions in administering the HPV vaccine.

Chapter 4: Research Design and Methodology

The literature review and theoretical perspectives discussed in the prior chapters inform the research design and methodology of this study. In this chapter, a detailed description of the conceptual and procedural aspects of the research study is presented. This includes the re-statement of the main research questions, along with sampling and data collection procedures, as well as variable definitions. This is followed by a discussion of the reliability and validity of the survey, along with a description of methodological challenges presented by the study. The chapter concludes with a summary of how each research question is answered through specific statistical analyses.

Main Research Questions

This study poses research questions that focus on perceptions and actions of health care providers. The aim of the research questions is to provide knowledge regarding the connection between social policy, human behavior, and the control of HPV.

A) Are providers' HPV vaccination rates higher for girls aged 13 to 17 compared with girls aged 9 to 12 in each state?

Hypothesis: Providers' vaccination rates will be significantly higher for girls aged 13 to 17 than for girls aged 9 to 12 in all four states.

B) Is type of state policy initiative associated with increased providers' HPV vaccination rates for girls ages 9 to 12 and girls 13 to 17?

Hypothesis: Providers' HPV vaccination rates will differ significantly for both age groups, with states that mandate health insurance coverage for the vaccine having the highest rates and those with no policy initiative the lowest rates.

C) What is the nature of the relationship between indicators of health care access and vaccination rates in both age groups?

Use of private insurance and belonging to a non-minority racial background will be predictive of higher provider HPV vaccination rates in both age groups.

D) What do healthcare providers identify as the most common barriers, supports, and HPV vaccination actions? Of the most common barriers and supports, which are reported as having the most impact on HPV vaccination actions?

Hypothesis: The most common barriers will include the financial burden to the patient and concerns about negative perceptions of patients about the HPV vaccine. The most common supports will include believing the HPV vaccine will improve women's lives, the state policy initiative, and the professional adherence to CDC recommendations. The most common actions will include counseling parents and seeking more information about the HPV vaccine. The financial burden will be reported as the most influential burden and the policy initiative will be the most influential support.

E) Which combination of predictors, including type of state-initiated HPV vaccine policy, type of healthcare provider, and the vaccine barriers and supports perceived by healthcare providers, is most predictive of healthcare providers' HPV vaccinations of girls aged 9 to 12 and girls aged 13 to 17? Is it the same combination for both age groups? Are there interaction effects between the predictors?

Hypothesis: Provider's HPV vaccination rates of girls aged 9 to 12 will be higher in New Mexico, where there is mandated health insurance coverage for girls 9-14 who are vaccinated, among nurse practitioners and physician assistants, and among those with fewer perceived barriers and more perceived supports of HPV vaccinations. Provider's HPV vaccination rates of girls aged 13 to 17 will be higher in New Mexico, among pediatricians and family physicians, and among those with fewer perceived barriers and more perceived supports of HPV vaccinations.

Methodological Procedures

The various methodological procedures are described in detail in this section, with sections covering sampling procedures, types and sources of data collected, methodological problems encountered, the reliability and validity of the measure, statistical analyses conducted, and the steps taken to protect human subjects.

Sampling Procedures

This study used a cross-sectional survey with randomly selected primary care providers who were likely to provide vaccination services to girls between the ages of 9 to 17, specifically family physicians, pediatricians, physician assistants (PAs), gynecologists, and nurse practitioners (NPs). By including NPs in the sample, there was increased representation of women providers in the study. Incorporating PAs was also important, as it was a population of primary care providers not yet included in the HPV literature.

Samples of primary care providers from New Mexico, North Carolina, Texas and Louisiana were selected due to state variations in policy initiatives, as well as the demographic characteristics of each state, and patient access to providers. State policy initiatives are described below based on the strength of the initiative, that is, which initiative is thought to have the strongest relationship with increased HPV vaccination rates.

First, in 2007, New Mexico's legislature passed a mandate (S.B. 1174) requiring all girls between the ages of 9 to 14 be vaccinated prior to school enrollment, with distribution of information to parents. The Governor vetoed that legislation shortly thereafter (National Conference of State Legislators, 2008). Later that year, the legislature successfully passed Senate Bill 407, which required that all health insurance companies provide coverage for the HPV vaccine for girls between the ages of 9 and 14, with typical deductible and coinsurance protocols in place. Given that the literature has identified the financial burden of the vaccine to be a

potentially large barrier, this policy initiative was considered the strongest of the four states. This policy initiative will be labeled “health insurance coverage”.

Second, in July 2007, North Carolina passed legislation (S.B. 260) that required the state Health Department to disseminate educational fact sheets on HPV and the vaccine to all parents of children in fifth through twelfth grades, starting in the 2007-2008 school year (National Conference of State Legislatures, 2008). As stated in the literature review, increased education about HPV and the vaccine was linked to increased intentions to vaccinate, thus putting it as the second strongest policy initiative. This policy initiative will be labeled “educational fact sheets to parents”.

Third, in February 2007, the governor of Texas signed an executive order requiring all girls entering sixth grade to be vaccinated against HPV prior to entering school the next year (National Conference of State Legislatures, 2008). This order was countermanded by the legislature (H.B. 1098), such that no state mandate for vaccination prior to school enrollment, either for elementary or secondary education, would be allowed. This legislation also required that schools provide parents with correct and scientific information about HPV vaccine at the time the vaccine is recommended on the immunization schedule, which is the timetable by age for when youth should get vaccinated (i.e., 11 or 12 years old for girls or 13 to 18 if not already vaccinated) (CDC, 2008). However, since there is no school requirement for the vaccine in Texas, this latter point was not enforceable (L. Garcia, personal communication, December 11, 2008).

Additionally in September 2007, the Texas legislature passed a bill (H.B. 1379) that required the state Department of Health to create and disseminate education on HPV and the vaccine for English and Spanish speaking populations. The law required that information on the efficacy, accessibility, and contraindications of the vaccine are included in the materials. According to Lupe Garcia with the Texas Department of Health, this legislation did not come with any appropriation of money, thus they were left with providing education at no additional cost to the taxpayers (personal communication, December 11, 2008). The implementation of this legislation involved putting educational fact sheets on their website, as well as distributing education to all school nurses across the state in public schools, and any private nurses who selected to receive the educational materials. Additionally, the Texas Department of Health created a network of internet links both on their website and with other state and national institutions that provide education on HPV and the vaccine. This policy initiative will be labeled "Bilingual education—Not Appropriated and Ban on Mandate".

Finally, Louisiana, which has not had any state HPV policy passed, served as a control state. Given that the literature shows an increase in vaccination when state policies are passed, such as vaccine mandates for school enrollment, not having any state policy was considered the weakest among the four states. This policy initiative will be labeled "no policy initiative".

This researcher used a purposive sampling strategy in selecting the four states in the study. The four states were selected not only for their differing policy

approaches to the HPV vaccine, but for their known demographics and socioeconomic characteristics that are typically correlated with lower access to healthcare, which suggests that access to care is an issue in these states. States were compared across critical socioeconomic characteristics supplied from the Census Bureau, with the four states selected having an higher percent of minority populations, a higher percent of residents living without health insurance coverage, and a higher percent of residents living in poverty. Social descriptors of the four states are detailed in Appendix A. Additionally, each of the four states had high cervical cancer incidence and mortality rates. In 2003, states were categorized into four categories based on cervical cancer incidence and mortality rates. Texas and Louisiana belonged to the group of states with the second highest rates and North Carolina and New Mexico fell into the third highest category (U.S. Cancer Statistics Working Group, 2006). The four states included populations with a higher percent of racial/ethnic groups who are at higher risk for cervical cancer. Further, states were selected based on the accessibility of providers' contact information. Based on information gathered during a small content validity study (McCave, 2007a) in which local providers interviewed provided potential avenues to obtain the lists of providers and from continued investigation, a list of primary care providers was obtained in each of the states through the boards of medicine and nursing, all of which had updated lists as of 2007 of licensed physicians and nurses available for purchase.

An Excel database for type of provider within each state was created for a mailing list. The entire sample was 1500 in total, with 375 providers from each state.

The sample size was first based on a power analysis (Cohen, 1992) using Sample G Power Software and the following estimates: 1) 95 % power; 2) .01 alpha level; 3) .15 effect size (medium effect); and 4) four predictors. The alpha level was set at .01 rather than .05 for two main reasons. According to Cohen (1988), typically the power value is set at .80, which allows a .05 probability of a Type I error occurring and a .20 probability of a Type II error occurring. The premise is that having a Type 1 error is four times more serious than experiencing a Type II error. It was decided that the power value would be set to .95 instead of .80 in this study to increase the chance to find a significant relationship. In conjunction, it was then determined that the alpha level should be set at a stricter level (.01) in order to reduce the probability of incorrectly rejecting a true null hypothesis. Second, since the measure was not an established index with test-retest reliability or criterion validity, the conservative alpha level was used to decrease the chance of Type I error, which could occur from measurement error.

This yielded a minimum final sample size requirement of 169. Further, a minimum response rate of 15% was expected, given that response rates for survey research varied widely, and the literature on surveying health providers about the HPV vaccine ranged from 15% to 50%. While having a total sample size of 1130 would produce the 169 final sample requirement if 15% was obtained, it was estimated that by using a larger total sample of 1500 with a 15% response rate, producing a final sample size of 225, the sample would be well above the necessary 169 cases in order to achieve 95% power. Additionally, the literature indicated a need

for studies with larger samples, as a majority of the studies included smaller final samples (N < 100), thus limiting generalizability. Also, it was decided that a sample size of 1500 would allow potential for within-state and across state comparisons. Lastly, the financial resources were considered as it applied to costs associated with mailings. While it was initially anticipated that the response rate would be above 15%, after the end of data collection, there were 227 completed surveys, resulting in a 15% response rate, which secured the necessary power to reduce Type II Error, thus giving confidence to the findings.

A proportionate stratified random sample (Engel & Schutt, 2005) by type of health provider of possible participants was derived to determine the sample (see Appendix B). For example, in Louisiana, the entire population of health providers obtained through the medical and nursing boards totaled 3,586 individuals. The list was comprised of mostly of nurse practitioners (1339 providers, 37%), then family physicians (938 providers, 26%), followed by pediatricians (734 providers, 21%), with gynecologists and physicians assistants making up the smallest portion of the sample (296 and 279 providers respectively, 8% for each). These groups were then proportionally sampled, to be representative of all health providers in the state. Continuing with the example of Louisiana, this resulted in 138 nurse practitioners randomly selected, 98 family physicians, 79 pediatricians, and 30 providers for both gynecologists and physicians assistants.

It was estimated that within the samples chosen for each type of provider, there would be 30% who would not fit into the "target population" of directly

working with girls ages 9-12 or 13-17. This estimation was derived from two pieces of information. First, there was a range of specificity associated with each state provider list; for example, some nursing boards offered only contact and licensure information, whereas some medical boards provided quite detailed information about each provider (such as specialization of practice). Second, from a small pilot study carried out in April 2008, in which 10 providers were randomly selected to answer key questions about the mail survey (see Appendix C), 30% of selected participants either indicated that they were non-target population providers (e.g., worked in sports medicine or neonatal unit) or did not respond at all, with the latter category considered potentially non-target as well.

Consequently, an additional random sample was generated to serve as a contingency sample for that 30% of non-target providers. Those providers were only used to replace those participants who indicated that they were not-target providers, or when a mailing was sent back as "return to sender". The contingency sample was not drawn upon for those who were able to receive the survey and chose not to respond. Following the example of Louisiana, an additional 114 providers were designated as the contingency sample, 42 of those were NPs, 30 were family physicians, 24 were pediatricians, and 9 were selected for both gynecologists and PAs. Once the designated 30% contingency sample was used up for a particular category, no other contingency providers were sent mailings from that sub-sample. For example, this occurred with New Mexico Physician Assistants, from which all the contingency sample were drawn; subsequently, when additional mailings were

returned within this sample as un-usable there were no more mailings sent out as replacements (such as drawing from the New Mexico pediatrician contingency sample).

In order to track respondents, a unique identifier was given to each potential participant. This unique identifier was printed on the outside of the return envelope and was not listed anywhere on the actual survey, to ensure anonymity. When surveys were returned, the unique identifiers allowed this researcher to document whether it was a completed survey, a "return to sender", or a "non-target population" respondent.

An invitation letter (see Appendix D) was sent out during the first week in May 2007 to 1500 providers, 375 providers from each state. The letter invited providers to access an online site that would allow them to complete the survey online, using Ultimate Survey (a program supported by the University of Kansas School of Social Welfare), with the option to request the survey via mail, email, or fax, or to indicate that the provider was not working directly with either 9-12 or 13-17 year olds. The web survey, which was password-protected, included the informed consent, along with the same version of the survey.

The invitation letter stated the purpose of the study and indicated that completing the survey demonstrated informed consent. The invitation letter clearly stated that the study was independent of any support from Merck™, the pharmaceutical company responsible for Gardasil ™. The mailing also included a signed letter of support (see Appendix E) from a local gynecologist and nurse

practitioner, both of whom were involved in one of the clinical trials with Gardasil ™. This method was suggested by local providers during the content validity study. It was also supported by Vangeest, Johnson, and Welch (2007), who in their review of the literature on methods to increase response rates with physicians, recommended including endorsements by professional associations.

As an incentive for returning a completed survey, this researcher donated $1 for each completed survey to The American Cancer Society (http://www.cancer.org), and emphasized the possibility of a sizeable donation if a large number of surveys returned. Participants were provided with a free executive summary of the findings of the study as further incentive and access to an informational website created by this student.

Within the first week of survey responses, it became apparent that there were technical difficulties with the Ultimate Survey program software. From close monitoring of the online access site and online survey, as well as contact from providers to this researcher via email and phone, it was evident that providers were attempting to complete the survey but were unable to do so for technical reasons (e.g., "getting 'kicked off' the server"). During this first week, the online access site received 81 "hits" but only 32 participants completed online surveys. Records indicated that some participants tried to access the online survey more than one time but were unable to do so. There were several participants who were able to request the survey by mail, fax, or email or indicate that they were not the target population; some respondents however, were unsuccessful in this process due to an additional

technical glitch in which the software did not provide the appropriate branching option designated for each unique request (e.g., link respondent to follow-up questions for requesting survey by fax). It was also discovered that there was no way to "track" the respondents, since the IP addresses between the initial access website and the actual online survey did not always correspond. This problem had not been anticipated, and in fact, information had been provided that tracking respondents in this way would not be an issue.

Given that the technical support staff could not determine the cause of these software problems, the web-based aspect of the survey was taken off-line and the mail survey became the main method of dissemination. Since the literature on web-based surveys indicated that typically participants respond within the first week of receiving the invitation, this was considered the first round of data collection.

Between May 19th and the 28th, a follow-up reminder letter and mailing of the actual survey was sent to each of the non-respondents, with a stamped, return envelope (see Appendix F and G for follow-up letter and mail survey). Additionally, as mailings came back "return to sender" (i.e., undeliverable) or came back with a note that the provider was not a "target population" respondent, a corresponding provider within the pool of randomly selected contingency providers was mailed an introduction letter (see Appendix H) along with the actual mail survey, and stamped, return envelope. Within the first two weeks, 70 envelopes had come back "return to sender". As mailings were returned completed, incomplete (i.e., survey missing answers on several primary variables or missing entire page(s) of survey), or return to

sender, this information was tracked using an Excel Database of all potential respondents and mail dates. An "ebb and flow" existed such that mailings would arrive sporadically as return to sender or incomplete due to not being a "target population" provider, and new contingency providers would be selected from the corresponding sub-sample and an initial mailing would be sent out. First follow-up mailings for these individuals occurred three to four weeks after the first mailing was sent. This process continued through the summer months and concluded during the month of October, 2008. Reminders were not sent to participants during the data collection period due to budgetary constraints.

Types and Sources of Data to be Gathered

Given that there was not a measure already established that addressed the specific research questions, a new survey was developed for this particular study (McCave, 2007a). A small face validity study was conducted with five healthcare providers to determine the feasibility of the instrument. It was revised to incorporate the specific feedback of the wording and presentation of the questions, as well as any salient questions that were not addressed. This small study received IRB approval through the University of Kansas.

The survey took approximately five minutes to complete, and asked professional and demographic information first, followed by questions regarding vaccination of female patients aged 9-12 and 13-17. Additional questions followed, addressing the HPV vaccination actions, perceived barriers and supports for both age groups. The six main variables of interest were:

1) *HPV vaccination actions:* nominally defined as any actions taken related to the vaccination of female patients aged 9-12 and 13-17, with initial ratio-level questions about actual vaccination rates for each age group and then questions about a range of actions that were indirect in nature (e.g., referring patient to a specialist or requesting an increased vaccine supply), which were nominal in level.

2) *Health Care Access Indicators reported by each provider*: nominally defined as a set of demographic and economic characteristics of providers and their patients. There are seven variables belonging to this cluster. They include: 1) percent of providers' minority patients ages 9-17; 2) percent of private insurance patients ages 9-17; 3) Ethnicity/Race of healthcare provider; 4) type of practice; 5) percent of providers' patients vaccinated using private insurance to pay for vaccine; 6) percent of providers' patients vaccinated using public insurance or funding to pay for vaccine; and 7) practice registered as a VFC approved site .These characteristics were made up of both nominal and ratio variables.

3) *Level of state policy initiative*: an ordinal variable defined as a) passed state legislation that requires insurance companies to provider coverage of the HPV vaccine for girls ages 9-14 ("health insurance" in New Mexico); b) passed state legislation that requires HPV vaccine educational materials distributed to parents of fifth through twelfth graders ("educational fact sheets to parents" in North Carolina); c) passed state legislation that requires education to the public in English and Spanish and a ban against future vaccine mandate for school enrollment ("bilingual

education—not appropriated and ban on mandate" in Texas) or d) no state policy initiative ("no policy initiative" in Louisiana).

4) *Job title of the health provider*: nominally defined as health provider who is likely to give the vaccine to girls ages 9 to 17 and was a nominal variable with five categories: a) pediatrician, b) family physician, c) nurse practitioner, d) gynecologist, and e) physician assistant.

5) *Vaccination barriers:* nominally defined as any process, attitude, belief, or object that limits the ability to participate in actions that lead to vaccination. Barriers were separated into five personal barriers and seven professional barriers, and a sum of these barriers indicated was used as a ratio variable that had two subscores and an overall score. Personal barriers included limited personal knowledge on HPV, personal discomfort with the topic, concerns about Merck's products, limited personal knowledge about the state initiative, and concerns about the media's presentation of the vaccine. Professional barriers included concerns about safety, effectiveness, medical purview, reduction in future Pap screenings, financial burdens, the state policy initiative, and patients' negative perceptions of the vaccine.

6) *Vaccination supports:* nominally defined as any process or object that promotes the ability to participate in actions that lead to vaccination. Similarly, supports were separated into four personal and seven professional supports, which also produced a summary ratio variable that had two subscores and an overall score. Personal supports included personal comfort with the topic, a positive personal experience with the vaccine, belief that the vaccine saves lives, and media exposure.

Professional supports included additional information on HPV and how to talk with parents, and financial resources available, as well as a forum with other providers, state policy initiative, and adherence to professional association's recommendations.

Additional survey items included questions on who typically initiates the conversation about HPV vaccination (i.e., provider, patient, another provider, or parent), amount spent by provider on the HPV vaccine, and protective financial measures related to the vaccine.

Efforts were made to reduce data entry error by doing manual data re-checking of every paper survey response. Any missed errors were discovered during the preliminary descriptive statistics analyses. Surveys initially completed with the Ultimate Survey software were imported directly into an Excel database and were double checked as well. Missing data was checked for each survey. When entering the data, the researcher made decisions about "rounding" that once made, were consistent throughout the data entry process. Such decisions included the following: 1) If a range was provided for the hours of week or the percent vaccinated, the mean was taken and rounded to the nearest whole number (e.g., "5-7" hrs a week was reported as 6; "50 to 75%" was reported as 63%); and 2) if a plus or minus label was attached to any of the values, such as the years spent practicing as a clinician or percent of clients who are minority patients, the consecutive whole number was reported (e.g., "40+" years was reported as 41 or "less than 50%" was reported as 49%). Also, given that so few individuals reported any new items on the "other" category for either barriers or supports, they were added to the open ended comments

recorded as “most impactful barriers” and “most impactful supports”. A code list was developed for each of the variables and all the data was coded accordingly. Each of the overall scores and subscores were manually calculated and entered into the Excel Database. Once all data was recorded, an SPSS database was created.

Validity and Reliability of Measure

Efforts were taken to increase the validity of the questions on the survey used in this study. First, face validity was achieved through both pre-testing and pilot testing the survey with healthcare providers. Questions on the survey were clearly related to the concepts being measured (e.g., vaccination was measured by questions asking percent vaccinated). Those included in the pre-test and pilot test confirmed that the survey “on its face” was valid (Engel & Schutt, 2005, pg. 89). Second, content validity can be achieved through the solicitation of feedback by experts as well as drawing from the literature to ensure the concepts meaning are fully covered by the measure. Through the pre-test and pilot test as well as an extensive review of the literature, this researcher attempted to include all questions that were relevant to HPV vaccination and the barriers and supports associated with vaccination. Neither criterion or construct validity were established for this study, however it may be reasonable that both may be tested in the future.

In regards to reliability, given that there were multiple items measured for the concepts of vaccination barriers, vaccination supports, and vaccination actions, it was important to assess the internal consistency of these items. Using Cronbach’s alpha coefficient as a measure of internal reliability, where alpha levels of .85 or .90 are

considered very high (Engel & Schutt, 2005), the tests confirmed that there were sufficient reliability within the three sets of items that each produced summary scores (namely HPV vaccination barriers, supports, and actions). First the internal consistency levels for the items asking about HPV vaccination barriers for girls ages 9-12 and 13-17 were $\alpha = .693$ and $\alpha = .670$, respectively. Second, the internal consistency levels for the items asking about HPV vaccination supports for girls ages 9-12 and 13-17 were $\alpha = .665$ and $\alpha = .684$, respectively. Lastly, the internal consistency levels for the items asking about HPV vaccination actions for girls ages 9-12 and 13-17 were $\alpha = .471$ and $\alpha = .409$, respectively. While these latter scores were not as high, it should be noted that the overall score for actions was not utilized in a multivariate analysis. For each of the items that made up the barriers and supports scales for both age groups, it was clear alpha was not increased significantly by eliminating any one item. Consequently, no additional analyses were conducted using modified barriers or supports scores.

Methodological Problems Encountered

Note that this study used a self-administered questionnaire, which can be considered a direct measure (Engel & Schutt, 2005); however, a limitation with this approach is that the survey queried attitudes rather than observing behaviors and gathering those data directly. Such forms of measurement may have affected the responses through social desirability, and as such, may have reduced the validity and reliability of the answers. It is possible that primary care providers may have provided answers that they believe were expected of them as medical professionals, rather than

accurately reporting their personal barriers. However, the content validity study (McCave, 2007a), aimed at eliminating leading questions within the questionnaire, along with the anonymity afforded to the respondent, may have lessened these effects. Further, responses from the survey suggest that participants were willing to share their personal barriers, thus reducing the social desirability bias.

An additional limitation was that there was not triangulation of the data through use of multiple sources of measurement (Engle & Schutt, 2005). Moreover, because this was a new questionnaire, it is possible that there was systematic error as a result of the measurement error; however, it was not likely known apriori because of the lack of prior use of the questionnaire, thus making it difficult to predict the nature of the systematic error.

Specific Statistical Analyses Used

Once the data was collected, the first step was to calculate descriptive statistics on the main variables mentioned above. The five research questions were answered through the following statistical methods.

Research Question A: Four paired-samples t-tests were conducted to understand whether providers' HPV vaccination rates were higher for girls aged 13-17 compared with girls aged 9-12 within each state.

Research Question B: Two univariate ANOVA tests were used to determine whether HPV vaccination rates for girls ages 9-12 and girls 13-17 differed significantly when considering the type of state policy.

Research Question C: Two multiple regression analyses were conducted to determine the whether indicators of health care access, namely insurance status and racial background, were predictive of higher HPV vaccination rates for each age group. Predictor variables included the percent of minority patients, percent of patients using private insurance, percent of patients using private or public insurance to pay for the vaccine, with the percent vaccinated in each age group as the two dependent variables.

Research Question D: Descriptive statistics were utilized to answer what healthcare providers identified as the most common barriers, supports, and HPV vaccination actions. The open ended questions that indicated which barriers and supports were reported as having the most impact on HPV vaccination actions were coded with Atlas software to allow a rank ordering of most influential barriers and supports.

Research Question E: Prior to running the necessary multiple regression models to determine which combination of predictors was most predictive of healthcare providers' HPV vaccinations of girls aged 9-12 and girls aged 13-17, two Spearman correlation matrixes (one for each age group) including the four independent variables (i.e., type of provider, state policy, overall barriers scores, and overall supports scores) were conducted for each age group to determine if multicollinearity was a problem. Only two of the independent variables were significantly correlated, namely type of provider with overall supports scores for both age groups. Given that multicollinearity was not found to be a preliminary issue, the

two multiple regression analyses were then conducted. From there tolerance statistics further confirmed that multicollinearity was not a problem.

Steps Taken to Protect Human Subjects

In order to protect participants, human subjects approval was sought through the University of Kansas Institutional Review Board (IRB). The IRB was completed prior to the start of the study. The subjects of this study were not health consumers, but adult healthcare professionals. There were no children included in this study, and women and minorities were included to the fullest extent possible. Increased representation of women and minorities was enhanced by including nurse practitioners in the sample and selecting states with larger percentages of minority groups.

There were not any expected risks for respondents beyond what was expected from daily professional life. Benefits for respondents included access to a summary of results from this study, as well an online resource page on information related to the HPV vaccine. Indirect benefits included contributing to the advancement of public health knowledge and research as well as indirectly contributing to the American Cancer Society, as $1 was donated for each survey returned. Steps were taken to ensure anonymity and confidentiality. This researcher did not ask social security information, as respondents did not receive any financial compensation. Completed mailed surveys were separated from their return envelopes, which contained the unique identifiers assigned to each potential participant. This allowed for the tracking of respondents and non-respondents while keeping participants' answers anonymous.

Returned mail surveys were kept in a locked cabinet as were the returned envelopes containing the unique identifiers. Excel databases with the lists of providers selected for sampling were saved on a password protected computer. Those initial participants who completed the survey online were able to maintain anonymity, as the online consent form and the actual surveys answers were separated, with the survey password protected and only this doctoral student had primary access to the data that arrived. This researcher agreed to keep all individual information, such as participants' names, confidential. Written informed consent was required of all participants; reading the information statement and completing the survey was considered informed consent, per the policy of the University of Kansas IRB (D. Hann, personal communication, November 14, 2007). Monitoring of this study by this student's dissertation chair and committee provided appropriate oversight of study procedures.

Chapter 5: Results

This chapter discusses the results from the statistical analyses used to answer the research questions. Prior to discussing each research question, statistics are shared that highlight how the data collection process led to the final sample as well as characteristics of the sample by state and type of provider. Following this is a brief presentation of the normality of data on the two dependent variables, namely vaccination of girls in each age group. This is followed by an account of distributions and statistics for each research question and the independent variables included.

Sample Derivation

In order to determine if there were any patterns of non-response, the data collection response and non-response process was examined closely. Table 1 highlights this process, with the first column indicating the number of respondents likely reached (i.e., number total participants minus the number of returned to sender and non-target population respondents). The second and third column indicate those respondents who were not reached due to relocation (i.e., returned to sender) or being reached but indicating that the provider did not work with the population of interest. The fourth column shows the number of respondents for each type of provider within each state who were selected as contingency participants. This is followed by the number of surveys completed within each state by type of provider and the associated response rate.

Table 1 reveals that Texas had the highest number of respondents who indicated that they were “non-target population” providers. New Mexico came in just

under Texas in this category but also had by the far the highest number of mailings returned to sender, which resulted in New Mexico having using the most contingency participants in all four states. The fewest contingency participants were utilized in North Carolina, where the number of respondents who identified as “non-target population” was the lowest and the number of mailings returned to sender was also on the lower end. In three of the four states, Nurse Practitioners made up the largest proportion of respondents who indicated that they were “non-target population” providers and also typically responded the most frequently. In contrast to this, Physician Assistants typically were the least likely to respond. Physicians Assistants were a unique group, in that they were the only ones who did not have any respondents for an entire state, namely Louisiana. This leads to questions as to whether Physicians Assistants are in any way different from those from the other three states, as it relates to the target population and/or topic of HPV vaccination.

Table 1 *Response and Non-Response During Data Collection by State and Type of Provider*

Variable	Total # Sent that Likely Reached Respondents	# Returned as Non-Target	# Returned to Sender	# Contingency Sent	# Completed ($N = 227$)	Average Response Rate
NM (Total)	366	33	60	85	71	19.4%
FP	96	7	17	24	16	16.7
GYN	33	1	3	4	6	18.2
PED	56	3	10	13	11	16.6
NP	127	16	10	26	32	25.2
PA	54	6	20	18*	6	11.1
LA (Total)	375	35	24	59	50	13.3
FP	100	3	9	12	12	12.0
GYN	30	1	3	4	5	16.7
PED	78	3	9	12	12	15.4
NP	137	25	1	26	21	15.3
PA	30	3	2	5	0	0.0
NC (Total)	383	13	19	32	60	15.7
FP	143	5	6	11	16	11.1
GYN	66	1	5	6	14	21.2
PED	83	4	2	6	13	15.7
NP	43	2	5	7	9	20.9
PA	48	1	1	2	8	16.7
TX (Total)	366	24	19	40	44	12.0
FP	101	1	5	6	12	9.9
GYN	45	1	1	22	6	13.3
PED	58	4	2	6	7	12.1
NP	103	11	1	12	14	13.6
PA	59	9	8	14*	5	8.5
Combined total	1490	105	122	216	227**	15.2

* Indicates contingency sample was completely utilized, thus preventing additional contingency mailings for Physician Assistants in New Mexico.
**Reflects total sample of 227 with 2 missing cases on type of provider variable

Characteristics of the Sample

From the 1490 providers likely to have received the survey, 227 individuals responded from the four states, with most responses from New Mexico, then North Carolina, Louisiana, followed by Texas (see Table 2). The overall response rate was 15.2%, which has been typical for the lower end of the survey response rates found with this population (Kellerman & Herold, 2001). Among the 227 respondents, most were Nurse Practitioners, followed by Family Physicians, Pediatricians, Gynecologists, and lastly Physician's Assistants. A proportionate stratified sample was selected by type of health provider, such that the proportion of each type of provider within each state was sampled (refer to Appendix A). The selected proportions for the sample were then compared with the actual proportional representation of each type of health provider in the final sample (See Table 3).

Table 2
Average Response Rates and Standard Deviations by State and Type of Provider (*N* = 227)

Variable	Total # Responded
State	
New Mexico	73 (32.2%)
North Carolina	60 (26.4%)
Louisiana	50 (22.0%)
Texas	44 (19.4%)
Total	227 (100.0%)
Type of Provider	
Nurse Practitioners	76 (33.5%)
Family Physicians	56 (24.7%)
Pediatricians	43 (18.9%)
Gynecologists	31 (13.7%)
Physician Assistants	19 (8.4%)
Missing	2 (0.8%)
Total	227 (100.0%)

Table 3
Proportionate Stratified Sampling by Provider Type with Proportional Representation in Final Sample

Variable	Proportion Sampled	Proportional Representation in Final Sample
New Mexico		
Physician assistants	17.2% (64)	8.5% (6)
Pediatricians	15.2% (56)	15.5% (11)
Gynecologists	8.9% (34)	8.5% (6)
Family physicians	24.7% (94)	22.5% (16)
Nurse practitioners	34.0% (127)	45.1% (32)
Total	100.0% (375)	100.0% (71)
Texas		
Physician assistants	16.2% (60)	11.4% (5)
Pediatricians	14.5% (56)	15.9% (7)
Gynecologists	11.6% (45)	13.6% (6)
Family physicians	30.2% (113)	27.3% (12)
Nurse practitioners	27.5% (101)	31.8% (14)
Total	100.0% (375)	100.0% (44)
Louisiana		
Physician assistants	7.7% (30)	0.0% (0)
Pediatricians	20.5% (79)	24.0% (12)
Gynecologists	8.6% (30)	10.0% (5)
Family physicians	26.2% (98)	24.0% (12)
Nurse practitioners	37.3% (138)	42.0% (21)
Total	100.0% (375)	100.0% (50)
North Carolina		
Physician assistants	12.1% (45)	13.3% (8)
Pediatricians	21.1% (79)	21.7% (13)
Gynecologists	16.9% (64)	23.3% (14)
Family physicians	39.2% (146)	26.7% (16)
Nurse practitioners	10.7% (41)	15.0% (9)
Total	100.0% (375)	100.0% (60)

There was a pattern in the proportional representation of each type of provider when compared with the proportion originally sampled. In all four states, nurse

practitioners made up a larger proportion of the collected sample than was selected based on the proportions of the sampling frame. In three of the four states, pediatricians and gynecologists responded very closely to their proportions selected in each state. In comparison, physician assistants were represented in a smaller proportion in three out of the four states. This highlights that nurse practitioners are more likely to be overrepresented in the final sample and physician assistants are likely to be underrepresented.

Females made up a higher proportion of the sample as compared to males (67% vs. 33%, respectively). The range of years spent practicing as a clinician spanned 1 year to 44 years, with a median of 12 years. Age of clinician ranged from 25 years old to 71 years old, with a median of 48 years of age.

Characteristics of Dependent Variables

Given that the percent vaccinated for each age group was the dependent variable for four of the five research questions, it is important to highlight the distribution of the data prior to discussing the results for these four research questions. It should be noted that there was positive skewing on the variable asking percent of girls 9-12 vaccinated, with a majority of providers reporting that they had not vaccinated any girls in this age group (see Figure 1). Additionally, there were 23 missing cases for this variable. In order to determine if the missing values were influencing the results, the analyses were re-run with the means of this variable for each state. It was concluded that the results did not differ greatly and no additional significant differences were found.

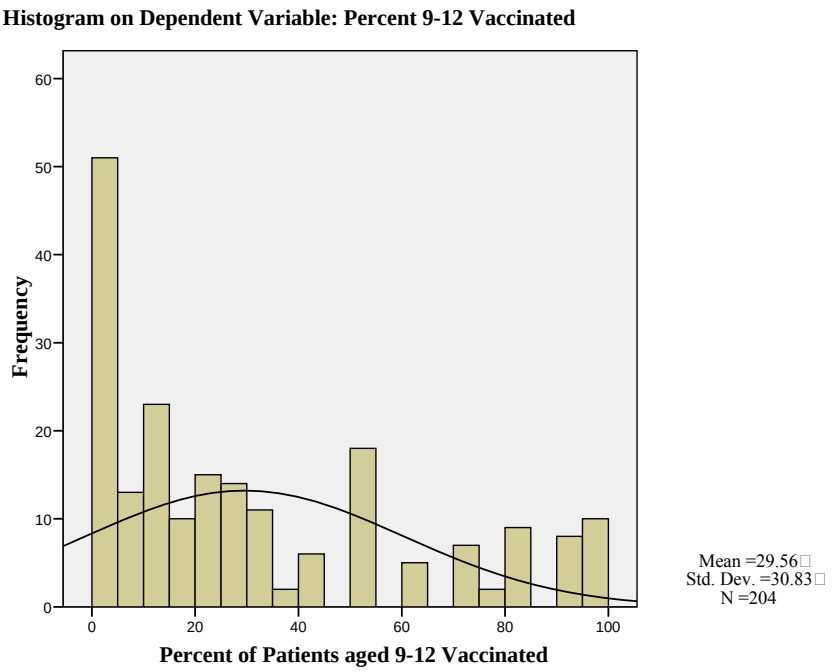

Figure 1
Histogram of Dependent Variable: Percent Girls 9-12 Vaccinated

The second dependent variable, percent of girls 13-17 vaccinated, also did not have a normal distribution, as there was a wide range of responses by providers (see Figure 2). While the most frequent response was not vaccinating at all, providers also frequently reported vaccinating 50% or more of their patients. Given this information about both dependent variables, it is likely that the distribution of responses may influence the results, however, the statistical tests utilized in the analysis are typically considered robust despite non-normal data (Mertler & Vannatta, 2005).

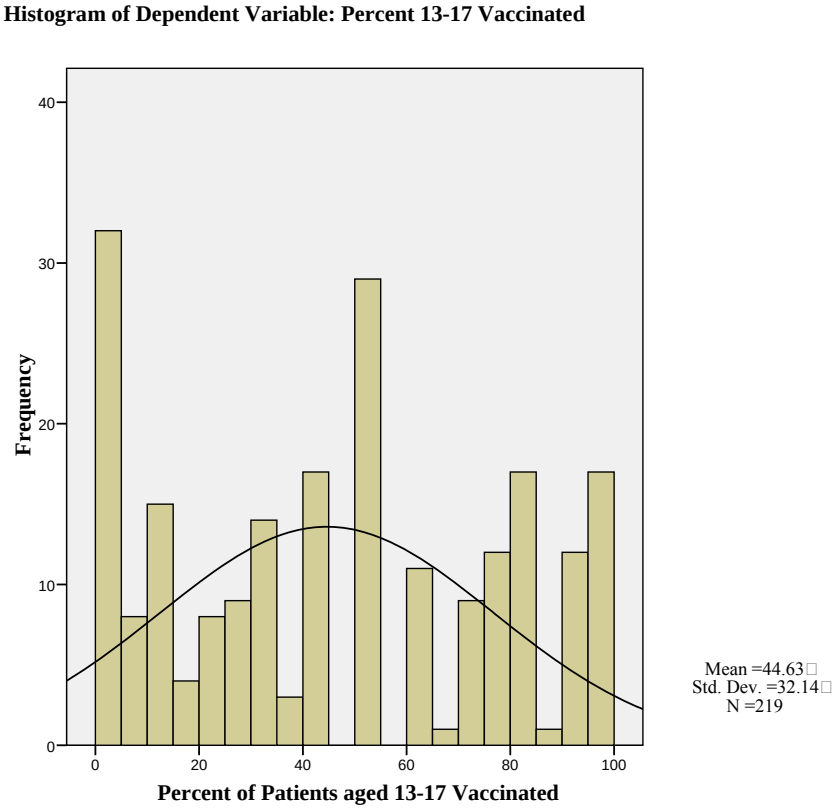

Figure 2
Histogram of Dependent Variable: Percent Girls 13-17 Vaccinated

Bivariate and Multivariate Statistics

This section of the results chapter reviews the statistical findings for five research questions examined in this study. Issues of normality and distribution are mentioned when the relevant variables were utilized in the analysis. The importance of the findings are also highlighted for each research question.

Research Question A

The first research question asked whether providers' HPV vaccination rates were higher for girls aged 13 to 17 compared with girls aged 9 to 12 in each state. The hypothesis was that vaccination rates would be significantly higher for girls aged 13-17 than for girls aged 9-12 in all four states. Four paired-samples t-tests were conducted to determine whether providers' HPV vaccination rates were significantly higher for girls aged 13-17 compared with girls aged 9-12 within each state (see Table 4 for statistical results, where $p \leq .01$ is significant). The hypothesis was confirmed for three of the four states. The results indicated that in New Mexico, Texas, and North Carolina, the mean vaccination rate for girls 13-17 was significantly greater than the mean vaccination rate for girls 9-12. Lastly, the results indicated that there was not a significant difference in Louisiana between the mean vaccination rate for girls in the two age groups. Notably, the standard deviations statistics were the highest in this state, indicating that there was the highest variability of responses in this particular state.

Table 4
T-tests of Vaccination Rates for Both Age Groups within each State

Variable	*M* % 13-17 Vaccinated (SD)	*M* % 9-12 Vaccinated (SD)	Statistical Results for Question A: Influence of Age on Vaccination
NC	57.1% (32.14)	33.7% (32.09)	$t(54) = -6.09$, $p = .000$*
LA	44.1 (33.61)	35.5 (34.01)	$t(45) = -2.34$, $p = .024$
NM	40.9 (30.66)	25.6 (29.78)	$t(62) = -4.78$, $p = .000$*
TX	35.9 (29.97)	24.7 (25.91)	$t(39) = -3.73$, $p = .001$*

*$p < .01$

There are two variables that are not included in this analysis that are potentially important to consider. The survey asked providers to report the number of hours worked each week with girls 9-12 and then again for girls 13-17. Notably, statistics indicate that the distribution of data on both of these variables were positively skewed, such the average number of hours worked directly each week with girls in both age groups was fewer than eleven hours. Providers reported working more frequently with girls 13-17 each week (M = 10.90, SD = 11.97) than girls 9-12 (M = 8.70, SD = 12.53). For the lower age group, 8.8% of providers indicated that they did not work at all with girls 9-12. For these individuals, they were only included in the final sample if they did work with girls in the older age group. Consequently, it could be that the vaccination rates for girls 13-17 may be higher due to providers treating a higher number of girls each week in this age group. Still, this finding is consistent with the literature in revealing that health providers are vaccinating girls in the older age group at higher rates then their younger counterparts. This is important given the CDC's recommendation that 11 and 12 year old girls are the target age group, which will be discussed in more depth in the next chapter.

Research Question B

This research question asked whether provider HPV vaccination rates for each age group would differ in states with varying policy initiatives. The hypothesis was that vaccination rates would differ significantly for both age groups depending on the state policy initiative, with New Mexico (with the mandate for health insurance coverage for girls 9-14) having the highest vaccination rates for both ages.

Overall, North Carolina had the highest vaccination of girls in both age groups, followed by Louisiana, New Mexico, and lastly Texas (see Table 5). It should be noted that in terms of the distribution of the data on the independent variable, state policy, there was a slight over-representation by New Mexico and under-representation by Texas, however the data was not skewed.

Table 5
Averages and Standard Deviations of Vaccination Rates for Each Age Group by State

Variable	Mean % Vaccinated, All Ages	Mean % 13-17 Vaccinated (SD)	Mean % 9-12 Vaccinated (SD)
NC	44.3%	55.8% (32.47) n = 59	32.7% (32.09) n = 63
LA	40.3	45.0 (33.49) n = 50	35.5 (34.01) n = 55
NM	32.6	39.6 (30.56) n = 67	25.6 (29.78) n = 40
TX	30.7	36.6 (29.04) n = 43	24.7 (25.91) n = 46
Total	37.0	44.3 (219)	29.6 (204)

Two ANOVA tests were completed to determine the effect of state policy initiative on mean percent of vaccination for each age group. The hypothesis that New Mexico would have significantly higher vaccination rates than the other three states was not supported, as New Mexico had lower vaccination rates for both age groups than both North Carolina and Louisiana. Results from the first ANOVA indicated that vaccination rates for 9-12 year old girls did not differ significantly when state policy initiative was considered ($F(3, 200) = 1.461$, $p = .226$). The second ANOVA test did show a significant difference for mean percent vaccination rates for

girls 13-17 when considering type of state policy ($F(3, 215) = 3.987$, $p = .009$). Mean differences for each age group by type of state policy can be found in Table 6. In considering post-hoc tests, homogeneity of variance was assumed after Levene's test was not significant, thus Tukey HSD was used to examine multiple comparisons. There were no significant differences found in the post-hoc tests that compared two states at a time.

Table 6
ANOVA tests of Vaccination Rates for Both Age Groups Across States

Variable	Mean % 13-17 Vaccinated (SD)	Mean % 9-12 Vaccinated (SD)
Statistical results for Question B: Influence of state policy on vaccination	$F(3, 215) = 3.987$, $p = .009$*	F(3, 200) = 1.461, p = .226
NC(a)	55.8 (32.47)	32.7 (32.09)
LA(b)	45.0 (33.49)	35.5 (34.01)
NM(c)	39.6 (30.56)	25.6 (29.78)
TX(d)	36.6 (29.04)	24.7 (25.91)
Total	44.6 (32.14)	29.6 (30.83)

*$p \leq .01$
(a) North Carolina legislation requires Health Dept. to provide educational fact sheets to parents of all children in grades 5-12 starting in 2007-08 school year
(b) Louisiana currently has no legislation passed related to HPV vaccination
(c) New Mexico legislation passed mandate for HPV vaccination for school enrollment but was overturned by Governor, now requires health insurance coverage for New Mexico girls ages 9-14 vaccinated
(d) Texas legislation vetoed Executive Order by Governor to mandate HPV vaccine for school enrollment, passed a ban against future mandates, and also requires education to the public from Dept. of Health for English and Spanish Speaking populations (the latter of which was not appropriated)

The findings from these analyses highlight the difficulty in measuring and studying the effects of state-wide social policy. While New Mexico was the only state examined that offered a financial incentive for the HPV vaccine (i.e., health insurance coverage for the vaccine), which has been repeatedly discussed as a major support in the literature, it was not reflected in vaccination rates for either age group. This is also confirmed by the descriptive statistics, which show that providers in New Mexico reported by far the lowest percent of patients using private insurance to pay for the vaccine. This raises the question as to why the initiative is not being utilized, perhaps because of lack of education to providers and patients about the state policy initiative. Another possibility may be that the veto by the Governor to counteract the vaccine mandate for school enrollment is having a negative influence on provider and patient vaccination behaviors. This will be discussed further in the next chapter.

Research Question C

This research question asked the nature of the relationship between indicators of health care access and vaccination rates in both age groups. The hypothesis was that using private insurance and belonging to a non-minority background would be predictive of higher HPV vaccination rates in both age groups. Two multiple regression analyses were conducted to predict vaccination rates for each age group using health access indicators as predictor variables. The four predictor variables included: 1) percent of patients aged 9-17 who are minorities, 2) percent of patients aged 9-17 using private insurance, 3) percent of providers' patients using private insurance to pay for the HPV vaccine, and 4) percent of providers' patients using

public insurance or monies to pay for the vaccine. The percent vaccinated in each age group served as the two dependent variables.

In terms of the normality of the independent variables, histograms revealed that both percent of patients who used private insurance to pay for the HPV vaccine and percent of patients who used public monies to pay for the vaccine had high numbers of cases on either end of the distribution (100% and 0%). This reflected that patients typically use only private or only public insurance, rather than a combination of both forms of insurance. The other two independent variables, percent of patients aged 9-17 who are minorities and percent of patients aged 9-17 who are private insurance patients, both had relatively normal distributions. Providers reported on average that half of their patients aged 9-17 were patients from minority backgrounds (Table 7). Similarly, providers reported nearly a 50/50 split between the rates of using private versus public insurance to pay for the vaccine, with a slightly larger proportion of their patients utilizing public insurance to pay for the vaccine. This makes sense, given that less than half of providers' patients aged 9-17 were identified as private insurance patients. This suggests that patients pay for vaccinations in the same manner that they pay for other health services.

Table 7
Averages and Standard Deviations on Four Predictors Variables

Variable	Mean (SD)
Percent of providers' patients aged 9-17 who are minorities	50.4% (30.07)
Percent of providers' patients aged 9-17 who are private insurance patients	43.8 (34.18)
Percent of patients using private insurance to pay for vaccine	44.4 (39.94)
Percent of patients using public insurance or monies to pay for vaccine	51.76 (40.71)

In the first multiple regression analysis, the linear combination of health indicators was not significantly related to HPV vaccination rates for girls 9-12, $F(4, 168) = 3.01$, $p = .02$, thus indicating that the model was not a good fit for predicting the dependent variable.

In the second multiple regression analysis for girls 13-17, the model was significant, $F(4, 181) = 4.77$, $p \leq .01$, with 9.5 percent of the variance in the dependent variable explained by the model. Two of the four health care access indicators that were used as predictor variables were individually significant in the model (See Table 8). These predictors included the percent of providers' patients who used private insurance to pay for the HPV vaccine ($t(184) = 3.34$, $p = .001$) and those who used public insurance or funding to pay for the vaccine ($t(184) = 2.81$, $p = .006$).

The results suggest that providers vaccinate girls ages 13-17 at a higher rate when a greater proportion of their patients are using private insurance to pay for the HPV vaccine, as well as using public insurance or monies. This is contrary to what would be expected, given that there was a strong negative bivariate correlation ($r = -.841$) between the two independent variables. However, there was only a small positive relationship with using private insurance to pay for the vaccine with vaccination rates for girls 13-17 ($r = .232$), and an even weaker negative relationship between using public insurance to pay for the vaccine with the dependent variable ($r = -.095$). This suggests that when you control for the other predictor variables, the use of public funding to pay for the vaccine no longer has a negative relationship with the dependent variable but rather predicts slightly higher vaccination rates.

Table 8
Multiple Regression Model Coefficients for Girls 13-17

Predictors	*B*	*β*	*t*
Percent of patients aged 9-17 private insurance	.041	.046	.393
Percent of patients aged 9-17 minority	-.081	-.082	-.919
Percent of patients vaccinated using private insurance to pay for HPV vaccine	.357	.475	3.34*
Percent of patients vaccinated using public insurance/monies to pay for HPV vaccine	.280	.379	2.81*

* $p \leq .01$

These findings suggest that racial background of patients is not a predictor of vaccination rates reported by providers, and thus poses the question as to whether it is an indicator of health care access in this particular context. Overall, across the four states, an average of 50% of providers' patients were reportedly from minority backgrounds. This raises the question whether access to vaccination is less difficult than other forms of health care, such as treatment for chronic illnesses. Further, in regards to the significance of utilizing private insurance to pay for the vaccine, North Carolina had the highest percent of providers reporting their patients used private insurance to pay for the vaccine. In connection to that, North Carolina had the highest vaccination rates of all four states. This suggests that providers will be more likely to vaccinate girls 13-17 if patients are able to access and utilize private insurance. As to the finding that using public insurance is predictive of vaccination, it is possible that accessibility to free vaccination played a role, as more than 50% of providers (NC = 57.1%, NM = 80.8%, and LA = 61.2%) in the three states with the highest

vaccination rates reported that their clinic or private practice was registered as an official VFC site, a service that is targeted towards Medicaid-Eligible patients. Texas had the lowest reported vaccination rate and the lowest percent of VFC registered providers (45.2%).

Research Question D

This research question asked about health providers' most frequently reported barriers, supports, and HPV vaccination actions. The follow-up question asked which barriers and supports had the most influence on HPV vaccination rates. Respondents were asked to indicate which of the five personal and seven professional HPV vaccination barriers they encountered as well as which of the four personal and seven professional HPV vaccination supports they had received. Additionally, respondents were asked which of the six actions they had participated in related to HPV vaccination. Respondents were asked to check all that applied for barriers, supports, and actions.

It was hypothesized that the most common actions would include counseling parents on the HPV vaccine and seeking additional information on the HPV vaccine. Additionally, the hypothesis for the most common barriers was that financial burden and concerns about negative perception of patients about the HPV vaccine would be most frequently reported. The most common supports were hypothesized to include the personal belief that the HPV vaccine would have a positive impact on women's lives, the state policy initiative, and adherence to professional recommendations

Further, it was hypothesized that financial burden would be reported as the most influential burden and the policy initiative as the most influential support.

The distribution on the variables for each age group on the overall barriers scores, overall supports scores, overall actions scores as well as the subscores for both the personal and professional barriers and supports were relatively normal. There was no major skewing found in any of the distributions. Most providers reported three to four vaccination activities for both age groups. Providers most typically reported zero to two barriers present overall for both age groups, while three to four supports were most frequently reported by providers for girls in both age groups.

Table 9
Averages and Standard Deviations on Activities, Barriers, and Supports Variables

Variable	Mean Score (SD)
Overall activities score	
Girls 9-12	2.93 (1.26)
Girls 13-17	3.09 (1.22)
Total	3.01
Overall barriers score	
Girls 9-12	2.36 (2.19)
Girls 13-17	3.09 (2.01)
Total	2.73
Overall supports score	
Girls 9-12	3.06 (1.98)
Girls 13-17	3.09 (2.01)
Total	3.08

Results from the descriptive statistics confirmed the hypothesis that the most frequently reported HPV vaccination actions for both age groups included providers counseling parents on the HPV vaccine and seeking more information on the HPV vaccine, as hypothesized (Table 10).

Table 10
Most Commonly Reported HPV Vaccination Activities for Girls 9-12 and 13-17 (N = 227)

Category on Variable	% Yes to Activity	
Age Group	9-12	13-17
Counseled parent on HPV vaccine	93.4	94.2
Sought more information on HPV vaccine	76.4	81.7
Counseled parent on VFC program	55.2	54.9
Asked nursed to counsel parent on HPV vaccine	37.7	42.4
Referred to public health clinician for HPV vaccine	24.5	27.7
Referred to specialist for HPV vaccine	5.7	8.5

Descriptive statistics confirmed the hypothesis that financial burden and concerns about patients' negative perceptions of the HPV vaccine were the most frequent barriers reported by providers (Table 11).

Table 11
Most Commonly Reported Barriers for Girls 9-12 and 13-17 (N = 227)

Category on Variable	% Yes to Barrier	
Personal (i.e., Provider) Barriers	9-12	13-17
Limited knowledge on HPV vaccine	21.5	18.6
Limited knowledge on state policy initiative	15.8	15.5
Belief that media is marketing HPV vaccine too much	14.4	13.6
Concern about Merck's products or lobbying efforts for Gardasil	14.8	13.2
Personal discomfort talking with parents about HPV vaccine	10.5	6.4
Professional Barriers		
Concerns about financial burden of HPV vaccine on patients and self	43.3	44.1
Concerns about patients' negative perceptions about HPV vaccine	35.2	32.3
Concerns about safety of HPV vaccine	23.3	21.4
Concerns about state HPV policy initiative or lack of initiative	21.0	20.5
Concerns about effectiveness of HPV vaccine	21.4	18.2
Concerns about vaccine reducing future pap screenings	9.0	10.9
Concerns HPV vaccine is outside the providers' scope of practice	2.4	2.3

The hypothesis regarding the most frequent supports reported by health providers' was partially confirmed, with personal belief in the positive impact of the HPV vaccine found to be the most commonly reported support and adherence to professional recommendations as the third most frequently reported support for both age groups (Table 12). However, contrary to the prediction that the state policy initiative would be one of the most frequently reported supports, it was sixth on the list. Instead, personal comfort talking with parents about the HPV vaccine, positive exposure from the media on the vaccine, and extra information provided by employer came ahead of state policy initiative.

Table 12
Most Commonly Reported Supports for Girls 9-12 and 13-17 (N = 227)

Category on Variable	% Yes to Support	
Personal (i.e., Provider) Supports	9-12	13-17
Belief that vaccine will have positive impact on young women's lives	84.3	85.2
Comfortable talking with parents about the sexual nature of the vaccine	69.0	72.2
Positive exposure from media on HPV vaccine	64.8	63.7
Positive experience with HPV vaccine (e.g., daughter vaccinated)	36.7	38.6
Professional Supports		
Adherence to Advisory Committee on Immunization Practices (ACIP) recommendations	66.7	66.5
Extra information provided by employer on the vaccine	61.0	61.0
State policy initiative aimed at promoting vaccine	45.7	47.0
Ability to provide vaccine free/reduced fee to non-Medicaid patients	41.4	42.7
Internal or external forum with other clinicians to discuss the vaccine	38.1	38.5
Presentation by social worker or medical professional on talking with parents	15.7	17.9
Presentation by social worker or medical professional on financial options for vaccine	12.9	13.8

For the two open ended questions that asked about the most important barriers and supports to HPV vaccination, Atlas software was used to qualitatively code the responses and then determine those barriers and supports most frequently reported. It should be noted that the results may not be representative of the sample, given that less than half of the respondents answered these open-ended questions. The hypothesis that the financial burden would be the most important barrier was not supported, as patients' (i.e., parents and youth) negative perceptions of the vaccine was reported to be the most inhibiting barrier to HPV vaccination (Table 13).

Table 13
Most important Barriers to Impeding Vaccination of Girls 9-17, with Exemplary Quotes

Type of Barrier	Frequency
Patient Negative Perceptions of HPV Vaccine	89
Parent Discomfort with Sexual Nature of Vaccine	
"Parents refusing vaccine: '*They don't need it this early', 'They would never get HPV*'	
"Parental concerns that when their daughter gets the vaccine it is a license to have sex"	
"Social stigma associated with sexually transmitted diseases"	
"Parents don't want their kids to have a shot that protects them against STD's."	
"Parents often uncomfortable and wish to delay"	
Financial Burden of HPV Vaccine	62
Cost for Patient and Provider	
"Cost to the patient if not covered by Medicaid, especially those who are undocumented immigrants"	
"Reimbursement from insurance companies/parents can't pay"	
"No coverage for vaccine in LA by Medicaid"	
"Cost—we order vaccine when requested by parent—do not keep on hand"	
"Poor reimbursement to private practice by Medicaid"	
"Cost—New Mexico Medicaid slow to cover the cost of HPV vaccine"	
Safety of HPV Vaccine	24
Safety Concerns of Parents and Providers	
"Newness of vaccine, and perceived 'uncertainty' of safety (not efficacy) of vaccine"	
"Parents perception that the patient should wait and see if this vaccine is going to have long term consequences negatively"	
Effectiveness of HPV Vaccine	20
Effectiveness Concerns of Parents and Providers	
"Length of time of coverage"	
"Long term studies for proof of effectiveness"	
"When/if a booster is necessary"	
"Concerns about effectiveness of vaccine after patient has two or more partners or abnormal pap"	

Similarly, the hypothesis that the state policy initiative would be reported as the most influential support was not supported. Rather, the personal belief in the positive impact of the HPV vaccine on young women's lives was reported to be the most important support in HPV vaccination (Table 14). Despite the small number of

respondents to these open-ended questions, the results are in line with the overall findings about most commonly reported barriers and supports.

Table 14
Most Influential Supports to Aiding Vaccination of Girls 9-17, with Exemplary Quotes

Type of Support	Frequency
Personal Belief of Positive Impact of HPV Vaccine	45
Provider's personal beliefs on benefit of HPV vaccine	
"Personal belief saving lives with vaccine"	
"Personal belief that vaccination is the right thing to do"	
"Impressed with it as first vaccine to make significant impact on female health"	
"Personal belief it will reduce 'bad paps' and eliminate cervical cancer in young women"	
"I am a huge advocate due to the cost of gyn visits I see each year due to HPV"	
Being Able to Provide HPV Vaccine Free or Discounted	25
Using public and private monies for covering vaccine costs	
"Financial assistance availability"	
"Free vaccine from VFC"	
"Sliding scale fee to those without insurance coverage to cover cost"	
"Wide insurance coverage of the vaccine"	
"Free vaccine from state"	
"Universal purchase state—thus no cost"	
Recommendations from Professional Associations	22
Providers following professional recommendations	
"ACIP and AAP recommendations"	
"Recommendations from ACOG [American College of Obstetricians and Gynecologists]"	
Support Services from Merck	21
Providers receiving support from Merck	
"Representatives from Merck have visited numerous times to talk about the HPV vaccine"	
"Merck rep education materials, professional and patient-oriented"	
"Merck staff support with packets in English and Spanish"	
"Merck reps put us in contact with MD's who can answer questions"	
"HPV rep at state nurse practitioner conference"	

Research Question E:

The final research question sought to identify the best predictors of vaccination rates for each age group and whether there were any significant interaction effects between the predictor variables. The four predictor variables included the type of provider, the type of state policy initiative, the overall barriers score, and the overall supports score. Type of provider was changed into dummy variables as it was a nominal variable. The interactions included in the analyses were between 1) type of provider and type of state policy, 2) type of provider and overall barriers scores, 3) type of provider and overall supports scores, 4) type of state policy and overall barriers scores, and 5) type of state policy and overall supports scores. There were two sets of interaction variables, one for each age group. There were nine steps or models in each of the regression analyses, with the Enter method used for both analyses. The Enter method places each predictor variable one at a time into the model without considering whether it significantly contributes to the model (Mertler & Vannatta, 2005). The criterion variables were the vaccination rates for each age group.

As mentioned earlier, the distributions of data on the overall barriers scores and overall supports scores variables were not skewed. On the type of provider variable, as mentioned earlier, there was an overrepresentation of nurse practitioners and an under-representation of physician assistants in the sample, according to their proportional representation in the sampling frame. Additionally, within each state there was a great deal of variance in the vaccination percents by type of health

provider for each age group (see Table 15). Family physicians, gynecologists, and pediatricians tended to report higher vaccination percentages than nursing practitioners and physician assistants. Louisiana was the only state that did not have any responses by one type of health provider (i.e., Physician Assistants).

Table 15
Average Vaccination Rates and Standard Deviations by Provider Type within Each State

Variable	NC	LA	NM	TX	Overall Mean
Vaccination by Provider Type					
Girls 9-12					
Gynecologist	46.0 (45.20*)	32.8 (39.20)	25.0 (50.00)	15.0 (23.81)	29.7
Pediatrician	27.1 (26.65)	48.8 (39.96)	19.6 (21.85)	31.4 (29.50)	31.7
Family Physician	34.7 (31.42)	30.2 (30.56)	35.3 (29.85)	30.8 (32.25)	32.8
Nurse Practitioner	29.4 (33.95)	30.9 (31.39)	24.6 (31.56)	21.8 (21.60)	26.7
Physician Assistant	25.3 (20.19)	----**	19.5 (17.65)	15.0 (15.41)	19.9
Overall Mean	32.7	35.5	25.6	24.7	
Girls 13-17					
Gynecologist	73.0 (21.37)	32.8 (21.69)	40.0 (45.46)	43.8 (47.85)	47.4
Pediatrician	61.2 (35.19)	63.4 (36.97)	43.9 (32.83)	38.1 (24.51)	51.7
Family Physician	58.1 (29.12)	34.6 (27.42)	46.3 (26.42)	41.9 (35.62)	45.2
Nurse Practitioner	52.8 (38.98)	40.0 (34.09)	40.5 (32.22)	28.7(25.95)	40.5
Physician Assistant	33.8 (27.99)	----**	36.0 (29.02)	29.0 (20.13)	32.9
Overall Mean	55.8	45.0	39.6	36.6	

*Standard Deviation
**No responses from Physician Assistants in Louisiana

In order to determine whether a multiple regression analysis was appropriate, Spearman correlation tests were conducted on the four predictor variables, one test

for each age group, and from those tests multicollinearity was not found to be a problem. Further, tolerance statistics confirmed this after running the multiple regression analyses.

The first multiple regression analysis examined the influence of the predictor variables on vaccination rates of girls aged 9-12. The only predictor variable that made a statistically significant contribution to the model was the overall barriers scores for girls 9-12. The coefficient statistics on this variable are presented in Table 16. Notably, there was a negative relationship between overall barriers scores with vaccination rates of girls 9-12. This suggests that when controlling for the other predictor variables, fewer barriers are predictive of higher vaccination rates.

Table 16
Coefficients for Final Model

Predictor Variable	*B*	β	*t*	*p*	R^2	*Adj.* R^2
Overall summed score of barriers girls 9-12	-3.795	-.277	-3.756	.000	11.4	8.4

The second multiple regression analysis examined the influence of the predictor variables on vaccination rates of girls aged 13-17. Two predictor variables made a statistically significant contribution to the model. In this model, 9.2% (R^2) of the variance was explained in the dependent variable (Adjusted R^2 = 6.3%). The first was the overall barriers scores for girls aged 13-17 and the second predictor was type of provider. The coefficient statistics on this variable are presented in Table 17. Again, there was a negative relationship between overall barriers scores with vaccination rates of girls 13-17. This further confirmed that when controlling for the

other predictor variables, fewer barriers are predictive of higher vaccination rates. For the second predictor variable, being a pediatrician was predictive of increased vaccination rates.

Table 17
Coefficients for Final Model

Predictor Variable	*B*	β	*t*	*p*
Overall summed score of barriers girls 13-17	-4.070	-.266	-3.803	.000
Type of Provider--Pediatrician	24.065	.293	2.639	.005

The importance of these findings is that there is combined evidence pointing to the importance of reducing a variety of barriers to HPV vaccination.

When a bivariate correlation matrix was produced with the four predictor variables and the dependent variables, there was a significant negative relationship found between overall barriers with vaccination of girls ages 9-12 and 13-17. This is important to consider, particularly for the older age group, in that controlling for the other predictor variables allowed the most significant predictor variables to be revealed.

Chapter 6: Implications and Conclusions

This specific study makes a significant contribution to the literature, as it is the first to combine a sample of differing health provider positions to determine what percent of their female patients they had vaccinated against HPV. Additionally, this is one of the first studies to look at the implications of public policy on HPV vaccination as well as current perceived barriers, supports, and actions of health providers, as opposed to perceptions based on a hypothetical scenario.

Consistency with the Literature on HPV Vaccination Intentions

Results from this study indicate that vaccination rates for girls 9-12 and 13-17 did vary from one another significantly, with the older group having higher vaccination rates in New Mexico, North Carolina, and Texas. This was to be expected, given that the literature on intentions to vaccinate against HPV clearly favors older female adolescents as compared with pre-adolescent girls (refer back to Chapter 3 for Review on Literature). Comments made in the open-ended questions reflect some degree of discomfort from both providers and in particular, parents, with vaccinating pre-teen girls against HPV.

Additionally, the second most frequently reported barrier by providers was the negative perceptions of the HPV vaccine by their patients and, most often, the parents of patients. Consequently, it is not surprising that a frequently mentioned support for vaccination by providers was being comfortable talking with parents about the sexual nature of the HPV vaccine. Given that the CDC has specifically recommended targeting pre-adolescent girls ages 11-12, this dissonance will need to be addressed to

increase the comfort level of both stakeholders. Social workers employed in health care settings have a unique opportunity to present ways for providers to talk with parents about the HPV vaccine and how to address parents' concerns about the sexual implications of the vaccine. Additionally, social workers can collaborate with health providers by promoting accurate information about HPV when working with parents and discuss any concerns about talking with their pre-adolescents about the vaccine.

Consistency with the Theory of Planned Behavior Constructs

While some providers have reservations that may inhibit vaccination, findings show that providers who vaccinate at a higher percent in one age group tend to vaccinate the other age group at a higher rate as well. The Theory of Planned Behavior would suggest that these providers may have personal beliefs that are positive toward vaccination, either towards vaccination in general or specifically for HPV because of the positive impact it can have on reducing cervical cancer; this was confirmed in the findings, in which participants reported the most common support for vaccination is the positive personal belief that vaccination would have a positive impact on young women's lives.

The Theory of Planned Behavior would also suggest that providers may tend to vaccinate at higher rates when they internalize the subjective norms of their peers and profession (i.e., other providers and the CDC or AAP) as highly influential. Again, this study reveals that normative beliefs were important, as adhering to professional recommendations was the third most commonly reported support.

The last construct in the Theory of Planned Behavior suggests that providers' vaccination rates would be directly related to their sense of self-efficacy. The survey questions aimed at understanding the self-efficacy of providers were those that focused on the availability of both internal and external resources to discuss and offer the vaccine to patients (e.g., information provided within employment site about the vaccine; personal comfort level talking with parents about the vaccine). This latter statement is also supported by the findings, in which an increased barrier scores were predictive of reduced vaccination by providers serving girls aged 9-12 and 13-17 when controlling for type of state policy initiative, type of provider, and number of supports received. Further, the second most commonly reported support was the personal comfort level of talking with parents about the vaccine. This finding is suggestive of higher perceived behavioral control, in terms of the self-efficacy of counseling parents. Given that higher levels of comfort talking with parents was associated with personal beliefs that the vaccine has a positive impact for both age groups, it would follow that these two aspects are important factors that influence vaccination behaviors.

In addition, this study suggests that providers' serving a higher proportion of patients using private insurance as well as public insurance or monies to pay for the HPV vaccine is predictive of higher vaccination for girls 13-17. This may be attributed to the perceived behavioral control aspect of the Theory of Planned Behavior, in that providers may be more willing to offer the vaccine to youth if they perceive patients' families as being able to use private insurance to cover at least part

of the cost. Providers' perceived behavioral control may diminish when financial barriers are presented, which appears to be quite often, given that financial burden was reported as the second most commonly reported barrier to vaccination for both age groups. Consequently, perceived behavioral control aspect will be enhanced when providers working with families who do not have the resources to pay for the vaccine are eligible for the VFC program. It may be that providers vaccinate those both privately and publicly insured, however, there may be families, such as working-class families, who do not qualify for VFC and/or who are underinsured.

Interestingly, in New Mexico, the only state examined with a mandate for health insurance coverage for girls 9-14, and the state whose majority of providers reported their patients using public funds for HPV vaccination (the highest among all four states), there were still lower vaccination rates for both age groups than either North Carolina or Louisiana. This raises the question as to why the initiative is not being utilized, perhaps as a result of lack of education to providers and patients about the state policy initiative. Further, New Mexico is one of the states that have a universal coverage policy for required vaccines, which means that all required vaccines are provided free of charge to any children 18 years and younger, regardless of insurance status (Gudeman, 2007). Since the HPV vaccine is not required, it is not included in this universal coverage policy. If it did include this vaccine, it would be expected that the percent of patients using public funding for obtaining the vaccine would be much higher.

North Carolina is also a universal immunization state (Gudeman, 2007). However, since the HPV vaccine is not currently required by the CDC but rather is recommended, only those youth who qualify for the VFC program are able to access the HPV vaccine free of charge. If the CDC adds the HPV vaccine to the required immunizations list, then it is likely that the vaccination rates will increase in this state once the financial burden is eliminated.

Additionally, there may be reduced perceived behavioral control when providers perceive the vaccine as a financial risk or liability for the clinic they work for or themselves when they are self-employed. While a majority (63%) reported spending $10,000 or less on the HPV vaccine, the remaining third have spent exceedingly more to purchase and store the vaccine. In addition, 58% reported requesting an increased vaccine supply, and almost 30% reported keeping their HPV vaccine supply low to protect against financial loss.

The Role of State Policy

The effort to understand the role of state policy on vaccination behaviors of providers is preliminary given the lack of current research. When state policy was considered in this study, the difference in vaccination rates was significant only for providers vaccinating 13-17 year-old girls.

Attention to state policy by social workers and public health workers may be important, however, there is not a definitive answer as to the role of state policy on provider vaccination. This is highlighted in the results of the study, in that providers in Louisiana, which has no state policy initiative, reported higher vaccination

percentages than either New Mexico or Texas. Louisiana could have higher reported vaccination rates over New Mexico and Texas for three reasons. First, it could be that it is too early to see the impact of state policy initiatives aimed at promoting the vaccine in these two states. Implementation of state level policy is a slow process that can take can months to years to be fully integrated across the entire state. Second, it could be that the policies aimed at promoting vaccination in New Mexico and Texas are not having the intended effect. Providers in New Mexico reported the lowest percentage of patients using private insurance to pay for the vaccine. This is counterintuitive, given that the state policy initiative is intended to encourage vaccination by mandating private health insurance coverage for the vaccine. It could be that there has been limited dissemination by policy makers, health insurance companies, and Merck to providers and patients that this coverage is available. It may also be that despite the coverage offered, the remaining financial burden is still too heavy for consumers to pay, given that the state policy does not require complete financial coverage of the vaccine (deductibles and co-insurance payments apply). In Texas, it could be that because there was not an appropriation of funds assigned to the passed legislation mandating education of the public, the policy it is not having the desired impact. With no additional resources offered to the Texas Health Department to disseminate the educational materials, it may be that it has had a limited effect thus far.

Third, it could be that Louisiana, with no policy initiative, was actually a better environment for vaccination than having a state that had taken legislative or

executive action against the vaccination mandate for school enrollment. Given that New Mexico and Texas had the lowest vaccination rates and both shared the veto against the vaccination mandate for school enrollment, it may be that that form of social policy did play a negative role in vaccination, thus leading Louisiana to come out ahead of both of these states. Considerations regarding the role of social policy should include the extremely dynamic nature of publicizing and implementing state policy on the HPV vaccine; across the country, there has been incredible movement within and between states in terms of the modification, addition, and deletion of initiatives. Both Texas and New Mexico have the historical context of being the first two states in which the mandate of the vaccine for school enrollment failed with enormous public attention. In connection, controversy around Merck's role in the pressure to implement a vaccine mandate as well as the morality politics of a vaccine to prevent an STD may be influential. Both states effectively made a mandate in the near future improbable, perhaps unwittingly negating the influence of less controversial policy initiatives that were later implemented (i.e., health insurance coverage and an educational materials on the Internet and to school nurses).

Alternatively, it is possible that state policy does have an impact, but that this study was unable to detect the effect it had on vaccination rates. One reason for this could be that the survey did not ask enough specific questions about each state's policy initiative(s) to be able to clearly separate out the effect of it on vaccination rates. It could also be that since fewer barriers were predictive of higher vaccination, that a reduced overall barriers score was actually a proxy for the positive effect of

state policy, particularly as questions about barriers asked about the financial burden of the vaccine, the negative perception of the vaccine by patients (which can be reduced through education), and limited knowledge of the provider (which may be reduced through dissemination of education as well). Another reason may be that the sample was not large enough to reflect the impact of a state-wide policy initiative, and that with a larger, more state-wide representative sample, the effect of policy could more effectively captured.

Application to Social Work

Social workers are often on the front lines of health care service provision, whether it be in a hospital setting, free healthcare clinic, or public health department. Social workers who are employed in schools, mental health centers, residential or group homes, or in child welfare frequently interact and collaborate with health providers who are providing health care services to their clients. Further, social workers are often in management or administration positions within these types of settings and may even supervise health providers. For these reasons, along with social work's interest in disease prevention, as evidenced by the discussion of increasing numbers of joint public health and social work graduate degree programs (Bracht, 2000), it is important to consider the role social workers can play in supporting those interested in HPV vaccination, such as consumers and health providers. To assist with the development of primary prevention activities, education and social change within the community, collaboration and consultation between those in social work, the public health arena, and primary care providers will be critical.

One area that social work can offer assistance is education and dissemination of information to consumers, health providers, and to health service oriented agencies. Providers frequently reported counseling parents on the HPV vaccine, which is not surprising given the high percentages of parents and young women who report limited knowledge about the causes and consequences of HPV (see Chapter 3 for Literature Review). Social workers can help to triangulate that information by educating themselves about HPV and the vaccine and offering education to their clients, particularly to parents and to young women. Some parents or community groups may see this as promoting the vaccine, which is controversial given that this issue manifests itself in the context of sexual behavior of young people, an area that is often taboo and unacknowledged. It is important to validate clients' realities that this is an uncomfortable topic, but that having accurate information is necessary to making an informed decision. This may be useful particularly for those patients who may encounter a health provider who also has limited information about HPV and the vaccine. In this sample, approximately 20% of the providers reported the barrier of having limited knowledge of the HPV vaccine and even more reported seeking additional information about the HPV vaccine as an action. It is likely that if a provider is not educated about HPV and/or the vaccine, the provider may not initiate a conversation about it to patients.

In connection with counseling parents, more than half of providers reported counseling parents on the VFC program. Since patients may be unaware that they are eligible to qualify for this program, social workers who are employed in health care

settings or in schools may educate consumers about the eligibility requirements and refer clients to VFC registered clinics.

Additionally, for those social workers who are working in medical settings or who are administrators in such settings where vaccination is occurring, it may be useful to provide specific supports for providers in that clinic or to educate local clinics about the benefits of such supports. Specifically, receiving extra information about HPV and the vaccine was reported as the second most common support. Offering this type of support may lead to an increased sense of self-efficacy by providers and thus lead to increased service utilization by patients. When extra information is provided in such contexts, addressing safety concerns about the HPV vaccine will be important, given that such concerns were reported as the third most common barrier to vaccination. Given the newness of the vaccine, part of that concern appears to stem from the absence of longitudinal data on possible future side effects of the vaccine. Bringing in medical professionals who worked with the clinical trials of Gardasil™ or representatives from Merck may reduce such concerns. Recommending that extra information be provided at conferences held by professional associations, such as the American Academy of Nurse Practitioners (AANP) or the American Association of Family Physicians (AAFP), may also be part of this process. Particularly as nurse practitioners and physician assistants tended to vaccinate at lower rates than pediatricians, family physicians, or gynecologists, it may be that these two groups may need additional support. Given that being a pediatrician was predictive of higher vaccination rates in this study, it would be worthwhile to

investigate further the differences in attitudes and behaviors by type of health provider.

The Theory of Planned Behavior would suggest that in order to increase vaccination rates, the personal beliefs and subjective norms will need to be positively oriented toward vaccination and that both providers and parents would need to have perceived behavioral control (i.e., feel self-efficacious) to utilize the vaccine. This may be complicated, particularly in vaccinating pre-adolescent girls, by the taboo nature of the HPV vaccine. Providers and patients' personal beliefs may be influenced by their religious or moral ideologies that lead them to resist the HPV vaccine because HPV is sexually transmitted. Giving the vaccine acknowledges the inherent sexual self of the recipient of the vaccine. This can be an uncomfortable acknowledgement for parents and providers. Similarly, the social norms supported by religious groups may again not support the vaccine because of its connection to sexuality. These beliefs may certainly influence the level of perceived behavioral control by parents and providers, as they may not have accurate information or they may have conflicting information presented.

Social work is about breaking down communication barriers and talking about topics that are taboo. The importance of actively listening and effectively communicating with providers and parents about this issue should not be underestimated. It may be that the decision to get a pre-teen vaccinated is a source of great stress between couples or between a teenager and her parent. The tension of this vaccine in terms of the cultural norms and the symbolic meaning behind vaccination

is palpable. This is evident in the literature, but also in the conversations this researcher has had with friends, family members, and colleagues about this study, in which many questions and discussions have arisen about whether vaccinating is the "right thing" or what age is the "right age" and whether the vaccine will pose safety concerns in the future. Stepping away from the morality debate, the reality of the situation is that providers and consumers will be asked to adapt to this new technology as it becomes fully integrated into the immunization schedule for pre-adolescent and adolescent girls. Further, it is likely that in the near future, the vaccine will become available for males in the U.S., as the vaccine has already been approved in Australia for males 9-15 (Australian Department of Health and Ageing, 2006). As with any new technology that has come to fruition, such as the Hepatitis B vaccine, or that will be developed in the coming years, such as an HIV vaccine, there will be need to be a clear assessment of what factors promote successful adaptation and how to create an infrastructure for these factors to be highly integrated into the health care system.

Limitations of Study

The implications of this study need to be considered within the constraints of the limitations.

Sampling Bias

Given that there were not lists available of healthcare providers working with girls in the two age groups of interest, the lists obtained from each state's medical and nursing boards included additional healthcare providers who were not part of the

target population. While these lists were comprehensive, they did include only those who providers who allowed their information to be released. Further, the lists were purchased in January 2007, and each list was updated by the boards in 2007 either annually, bi-annually, or quarterly. Thus, given that there were many "return to sender" responses, it is likely that some healthcare providers did not contact the state boards to update their information, such as if they relocated out of state or discontinued practicing. While a random sample was selected from these lists, it is apparent that the final sample was not entirely random. This limits the ability to generalize to all healthcare providers who work with girls in these two age groups.

Response Rate

While the response rate of 15 percent did fall within the range seen in the literature for this population, it leads to questions about whether the results are generalizable to the entire sample and beyond that to providers not surveyed in the four states. Two factors may have contributed to the low response rate. First, the lists obtained from each of the state's nursing and medical boards had limited information about each provider, particularly about their specialty. Thus, it was not surprising that returned surveys included a range of individuals either no longer employed or who were not working with the target population. New Mexico had the highest percents of returned surveys that were non-target population providers---as high as 44% for Physician's Assistants, which can be attributed to the minimal information provided by the boards in this state; only the names and addresses were provided for physicians, physician assistants, and nurse practitioners. Thus, it is likely that had the

sample been recruited through other additional means, such as going through each of the lists and determining which fit the target population through brief phone calls to each provider, there may have been a higher response rate. It is likely that many of those who were non-respondents fell into this category of not working with girls in the target age groups.

The technical difficulties that prevented the successful utilization of the online survey were unexpected and certainly limited some respondents from participating in the process. It is likely that some participants may have gotten frustrated with the online process, perhaps resulting in a lack of participation in the follow-up mailing. In connection with this, the response rate most likely would have been higher had there been additional follow-ups. One follow-up mailing was sent to each of the respondents. Additional follow-up mailings were not sent due to budgetary constraints. Since the online survey process did not continue, additional unexpected costs were associated with the follow-ups, as a stamped return envelope had to be provided along with the actual mail survey, which would not have been needed had the online survey worked. Had the online survey been successful, it may have increased the initial response rate as well, thus decreasing the need to expend further resources on follow-ups.

Missing Data and Distribution of Data

Aside from the response rate, there was missing data in the variables that were used for the analyses, though for most variables it was minimal. The three variables with the most missing data were 1) the percent of vaccinated female patients using

public funding to pay for the vaccine (missing 33 cases, 14.5% of sample), 2) percent of vaccinated female patients using private insurance to pay for the vaccine (missing 32 cases, 14.1% of sample) and 3) percent of patients aged 9-12 vaccinated (missing 23 cases, 10.1% of sample). When the missing data for these three variables were replaced with the means of these variables for each state, and the analyses that included these variables were re-run, the results did not differ greatly and no additional significant differences were found.

In terms of assuming normality, some of the primary variables used for analysis did not reflect a normal distribution, as demonstrated with histograms. Two variables had high numbers of cases on either end of the distribution, including percent of patients who used private insurance to pay for the HPV vaccine and percent of patients who used public monies to pay for the vaccine. This demonstrates that patients typically rely on either private or public insurance for health services. Additionally, the variable asking percent vaccinated for girls 9-12 was positively skewed, with a majority of providers reporting that they had not vaccinated any girls in this age group. This was in contrast to the variable that asked percent vaccinated for girls 13-17, with a majority of providers reporting percentages of vaccinating 50% and 100% of their patients in this age group. This highlights the need for further study with the same population to determine whether the data collected on these variables represented typical responses by providers or if it was unique to this sample. Still, as indicated earlier, the multivariate statistics used in this study are robust against non-normal data, thus limiting the likelihood that it affected the results.

Measurement Limitations

Recognizing the limitations of the actual survey instrument is also important. Given that this was the first survey to ask these specific questions, there was limited information about potential weaknesses in the survey questions and structure apriori. After getting the data, it was clear that certain questions on the survey were worded in such a way that did not lend itself to getting the most accurate information or that provided enough information for specific analyses at the state level. For example, if there had been a question that inquired how many female patients providers had in their practice, it would have allowed for a further calculation of an actual HPV vaccination rate for each provider, which could have been used in a calculation of a state HPV vaccination rate. Additionally, in an attempt to keep the survey short, questions about the two age groups were in adjoining columns (see Appendix G), thus leading to very similar answers for both age groups on activities, barriers, and supports. A possible reason for this was perhaps acquiescence bias, rather than an accurate reflection of the variance in behaviors and attitudes.

Further, while the state was used as an independent variable synonymous with the state policy initiative, it is quite possible that other aspects of the state could be causing a spurious relationship between differences in providers' reported vaccination percents. Other local factors could play a role, such as whether providers worked in a county or region that has a high concentration of medical shortage areas or higher percent of individuals in poverty. Also, since there was more than one state policy initiative in both New Mexico and Texas (the action against the school mandate along

with the current policy initiative), it is difficult to assess which had more influence, since it was not asked on the survey. It would have been useful to include a brief statement about each state's past and current policy initiatives and then ask a specific question about the positive and negative influence of each on provider's vaccination behaviors.

Accuracy of Data

Another consideration is that the data from providers may not have been completely accurate. While the small pilot test did show that a majority of providers believed that would be able to accurately report vaccination rates and use of private or public insurance to pay for the vaccine without consulting their medical records (see Appendix C), it may not have been reflective of the entire sample. Without verifying the medical records of each provider, there is no way to know for sure whether the providers may have over-estimated their vaccination rates. Additionally, they may have over-estimated for the questions asking the percent of their patients aged 9-17 who were minority patients and percent who were private insurance patients. Utilizing case records for future studies would vastly improve the confidence in the responses provided to these questions. Also, having a large portion of the survey use questions that were answered "yes" or "no" limits the accuracy of the data in that if a provider reports "yes" they have counseled a parent on the VFC program, it does not provide further information as to whether the provider engaged in this activity more than once or how often. Similarly, in asking "yes" or "no" responses for the questions related to personal and professional barriers and supports, respondents were not given

the opportunity to rank the barriers or supports or to indicate to what frequency or degree it occurred. While the most influential barrier and support was asked, more than half of respondents did not respond to this question.

Future Directions

This study provides an important starting point for future research that will examine the various factors associated with HPV vaccination of females 18 years and under. Future researchers can take from this study the known barriers and supports that have been identified as most influential in HPV vaccination and begin to determine whether that is generalizable outside of these four states. If so, the Theory of Planned Behavior can continue to serve as a foundation in which personal and professional barriers and supports can be examined in terms of their causal relationship to HPV vaccination. Still, other state policies that have been implemented elsewhere in the U.S. should be examined, such as in New Hampshire and Washington, where state legislatures appropriated funding to give the vaccine to a certain population of females. Additionally, states across the country are continuing to propose new legislation, such as mandated health coverage and thus studies can continue to research the impact of state policy on vaccination rates. In particular, studies should focus on what initiatives and interventions reduce the financial burden of the vaccine, particularly as it may be several years before a generic vaccine is available. It does appear evident that both providers and patients are impacted deeply by the cost of the vaccine.

Given the limited resources in state health departments, it is important for scholars to advise state policy makers as to whether there should be significant financial resources appropriated for state policy initiatives. In addition, since the proposed vaccination mandate for school enrollment has not yet been dismissed and may actually be implemented in the near future, it will be important to longitudinally evaluate the impact of that mandate, both on the perceptions of stakeholders and on vaccination rates.

Longitudinal studies on girls in both age groups will need to be conducted to determine whether the fears of parents that the HPV vaccine will lead to increased sexual activity is accurate. Similar to the comprehensive sexual education debate, even though longitudinal studies have demonstrated this form of education to be associated with reduced unintended pregnancies and sexually transmitted diseases, parents still believe it leads to sexual promiscuity (McCave, 2007b). In considering resistance to the HPV vaccine, particularly for parents of pre-adolescents, the importance of parents' beliefs will be critical. Understanding parents' personal beliefs as well as the influence of subjective norms (resistance to the vaccine by parents' peers, family members, clergy, etc.) may well play a vital role in whether parents vaccinate their daughters.

In addition, educating providers about specific state policy initiatives will be important, particularly as there may be an increase in research to determine the impact of state policy and what leads to the successful implementation of social policies. Some providers in Louisiana indicated that the state policy was in fact a

support; however, there is no state policy initiative in this state. Providers may not have the most recent information about the policy in their states. This is to be expected given the extremely volatile nature of the public policy realm that is difficult to follow without continual checking of key online sources that tracks the HPV policy initiatives. Future studies could determine the knowledge levels of providers regarding state policy initiatives and specific attitudes about potential policy initiatives.

Further, given that the HPV vaccine will most likely be made available for males in the next several years, it will be necessary to determine the impact of this new advance in technology, particularly as it will take the burden off of women only and perhaps draw attention to the universal risks for both females and males. Once the vaccine is available for males, further research into the intentions and behaviors of heterosexual and gay men will be important, as they are at risk for penile and anal cancer from HPV (Dunne, Nielson, Stone, Markowitz, & Giuliano, 2006).

While Physician Assistants were included for the first time in this study, additional health care providers may be considered in future research studies. According to McIntosh, Sturpe, and Khanna (2008), pharmacists should be considered as another type of provider who could act as a gatekeeper for the vaccine, as pharmacists are licensed in 46 states to administer vaccines. Since the vaccine is a three dose series, it can place added burden on both the physician and patient to make those visits; it may seem more reasonable to go to the local pharmacist instead. It could also potentially reach more vulnerable patients who have less access to care. It

has been recommended that physicians vaccinate their patients with the first two doses as well as provide the medical counseling on the vaccine and then have a pharmacist give the remaining dose in the community. Future research could examine that attitudes and vaccination rates of pharmacists if this becomes a common practice. It may be some time before this occurs however, as often pharmacists are often only allowed to vaccinate those who are 18 years of age or older, which brings up legal issues of consent for vaccination. Further, the influence of morality politics would certainly come into play, as was seen when RU486 became available in pharmacies. Physicians may also be concerned that patients may miss their check ups or well-child visits or that specific medical opportunities for discussing STDs and sex would be missed if patients received the vaccine in the pharmacy setting (McIntosh, Sturpe, & Khanna, 2008).

Lastly, future research may focus on the unique impact of the various public resources that can be utilized to support vaccination, such as the VFC program and the money appropriated for states and local jurisdictions through Section 317 of the Vaccination Assistance Act (Rein, Honeycutt, Rojas-Smith, & Hersey, 2006).

Conclusion

This study was intended to report the current perceived barriers and supports and actual HPV vaccination behaviors of primary care providers serving girls ages 9 to 12 and 13 to 17 within the context of varying state policy initiatives. A proportionate stratified random selection method was utilized to survey pediatricians, nurse practitioners, family physicians, gynecologists, and physician assistants in

Louisiana, New Mexico, North Carolina, and Texas. While overall response rate (15 percent) was low, a sizeable number (N = 227) of health providers were surveyed, providing important information about which barriers and supports are influential in HPV vaccination as well as giving an initial look into vaccination behaviors of providers. This study adds to the existing literature that highlights the importance of considering barriers and supports, particularly the influence of financial and psychological barriers, such as having a comfort level talking with parents about the vaccine and its sexual nature. It also points to the significance of personal beliefs, specifically having a belief that the HPV vaccine will have a positive impact on young women's lives. Further, the study confirms that adolescents ages 13 to 17 are getting vaccinated in higher proportions than their pre-adolescent counterparts. This area of research is still in its infancy; much more rigorous research both in the United States and abroad needs to be carried out to determine what factors play a significant role in increased utilization of the vaccine, particularly for the targeted age group, 11 to 12 year old girls, as recommended by the CDC. Scholars from public health and social psychology will undoubtedly be at the research table. Social work has a unique opportunity to join these scholars and be part of the creation of a whole body of literature that has global implications.

Appendix A

Table 1
Health Care Access Indicators Considered in Selecting the Four Study States

Health Care Access Indicators	North Carolina	New Mexico	Louisiana	Texas	United States
Ethnic Origins (2007 estimates)	9,061,032	1,969,915	4,293,204	23,904,380	301,621,157
White	74.00%	84.50%	65.10%	82.6%	80.0%
Black	21.70%	2.80%	31.90%	12.0%	12.80%
American Indian and Alaska Native	1.20%	9.50%	0.60%	0.7%	1.0%
Asian	1.90%	1.40%	1.40%	3.4%	4.40%
Native Hawaiian and Pacific Islanders	0.10%	0.10%	0.00%	0.1%	0.20%
Hispanic or Latino origin	7.0%	44.40%	3.20%	36.0%	15.10%
White persons not Hispanic	67.50%	42.30%	62.30%	47.90%	66.0%
Economic Indicators Median Household Income (2007)	$44,772	$41,501	$40,866	$47,563	$50,740
% Persons below Poverty (2007)	14.30%	17.90%	18.80%	16.3%	13.0%
% W/O Health Insurance (2003-2005 Averages)	16.20%	14.30%	18.70%	24.6%	15.70%

Data Compiled from U.S. Census Bureau (2007) and DeNavas-Walt, Proctor, & Lee (2006).

Appendix B

Table 1
New Mexico Stratified Random Sample Selection

% of Stratification	# Selected from Stratification	Additional 30% Contingency Sample	Total Selected Sample
% of PAs (337/1965) = 17%	17% of 375 = 64	19	83
% of PEDs (299/1965) = 15%	15% of 375 = 56	17	73
% of GYNs (176/1965) = 9%	9% of 375 = 34	10	44
% of FPs (485/1965) = 25%	25% of 375= 94	28	122
% of NPs (668/1965) = 34%	34% of 375 = 127	38	165
Total % of Providers = 100%	Total Stratified Sample = 375	Total Contingency Sample = 112	

Table 2
Texas Stratified Random Sample Selection

% of Stratification	# Selected from Stratification	Additional 30% Contingency Sample	Total Selected Sample
% of PAs (2957/18201) = 16%	16% of 375 = 60	18	78
% of PEDs (2636/18201) = 15%	15% of 375 = 56	17	73
% of GYNs (2117/18201) = 12%	12% of 375 = 45	14	59
% of FPs (5494/18201) = 30%	30% of 375 = 113	34	146
% of NPs (4997/18201) = 27%	27% of 375 = 101	30	131
Total % of Providers = 100%	Total Stratified Sample = 375	Total Contingency Sample = 113	

Table 3
Louisiana Stratified Random Sample Selection

% of Stratification	# Selected from Stratification	Additional 30% Contingency Sample	Total Selected Sample
% of PAs (279/3586) = 8%	8% of 375 = 30	9	39
% of PEDs (734/3586) = 21%	21% of 375 = 79	24	103
% of GYNs (296/3586) = 8%	8% of 375 = 30	9	39
% of FPs (938/3586) = 26%	26% of 375 = 98	30	128
% of NPs (1339/3586) = 37%	37% of 375 = 138	42	180
Total % of Providers = 100%	Total Stratified Sample = 375	Total Contingency Sample = 114	

Table 4
North Carolina Stratified Random Sample Selection

% of Stratification	# Selected from Stratification	Additional 30% Contingency Sample	Total Selected Sample
% of PAs (718/5933) = 12%	12% of 375 = 45	14	59
% of PEDs (1249/5933) = 21%	21% of 375 = 79	24	103
% of GYNs (1005/5933) = 17%	17% of 375 = 64	19	83
% of FPs (2328/5933) = 39%	39% of 375 = 146	44	186
% of NPs (633/5933) = 11%	11% of 375 = 41	13	54
Total % of Providers = 100%	Total Stratified Sample = 375	Total Contingency Sample = 114	

Appendix C

This Study is Approved by the Human Subjects Committee Lawrence Campus, University of Kansas. Approval expires 12/4/2008.

January 2008

Hello. You've been selected as a valued clinician to offer input on a small but very important section of my dissertation survey, of which I will be sending to clinicians like yourself in the near future. The survey may even come to you. In order to make sure I get the most accurate information from the survey, I am trying to find out how accessible the following questions are to someone like yourself.

If you can spare a few minutes, I would greatly appreciate it. All you have to do is think about your own practice and try to answer the questions. You don't even have to put the answers down. Then, just provide your feedback below, place this sheet into the self-addressed, stamped envelope and you are done!

Please answer the questions below that ask about your HPV vaccination actions.

13. Patient Information-- HPV Vaccination		**Percentage**
a	What percentage of your female patients aged **9-12** have you vaccinated against HPV?	
b	What percentage of your female patients aged **13-17** have you vaccinated against HPV?	
c	Of those female patients you have vaccinated, what percentage have used **private insurance** to cover part or all of the cost of the HPV vaccine?	
d	Of those female patients you have vaccinated, what percentage have received the HPV vaccine for free or at a discount through **public funding**? (Such as Medicaid, VFC, state monies, etc.)	

Feedback Questions:

1. Would you be able to answer these questions without consulting your patient records?
Y or N

2. How accurate do you think your answers would be without consulting your patient records?
   a. Extremely Accurate
   b. Mostly Accurate
   c. Somewhat Accurate
   d. Not Very Accurate
   e. Unsure

3. If you had to consult your patient records, would that deter you from completing the survey? Y or N

4. In the space below, please provide any suggestions you have for making these questions easier to answer in a short amount of time.

Thank you for your time! Your input is very important and will contribute to the successful completion of this study.

Sincerely,

Emily McCave, MSW
Doctoral Candidate

Appendix D

Approved by the Human Subjects Committee Lawrence Campus, University of Kansas. Approval expires one year from 12/4/2007.

Hello! I am a doctoral candidate at the University of Kansas, School of Social Welfare. I am interested in understanding your perceptions and behaviors with the new HPV vaccine, particularly around vaccination of girls between the ages of 9 and 17. You have been selected to participate in this study, which involves taking a short survey. The entire process will take less than 15 minutes. For every survey completed, $1 will be donated to the American Cancer Society, with the potential for $1500 to be donated! In this mailing, you will find a letter of support from clinicians like yourself who are familiar with my study.

For your convenience, I have created a secure initial access website with options to accommodate your individual preference and that allows for a confidential and anonymous process. This site will provide you with the option to **continue with the online survey**, **request the survey by fax, E-mail, or postal mail**, or to let me know if you **do not** treat pre-adolescent or teen girls.

To complete this process, there are four easy steps:

1. Please type into your internet browser: **http://tinyurl.com/272fnk**
(URL has been changed and shortened for your convenience)
To protect your confidentiality, you will be asked to enter in the password: HPV2008

2. Read over the information statement about the study.

3. Enter your **unique identifier**, which is:
This number is used only to fill your individual request, as well as for tracking non-respondents for follow-up mailings. It will not be linked to your answers if you complete the survey.

4. Select which option meets your individual preference.

As an additional thank you, I have created a "helpful links" page that you can access following completion of the survey that has links to online resources concerning the HPV vaccine.

Thank you for your time. Your participation is important for continued prevention efforts of cervical cancer.

Sincerely,

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Appendix E

January 2008

Dear Clinician:

We support the study conducted by Emily McCave regarding HPV vaccination actions, barriers, and supports with girls ages 9-17. Your participation will provide valuable insight into the factors that influence clinician's decisions to administer the HPV vaccine. For each questionnaire returned, $1 will be donated by Ms. McCave to the American Cancer Society, an organization that is nationally recognized for its efforts to eliminate cancer.

Our interest in HPV Disease and the vaccine developed due to the high prevalence in the college-age population.

We hope you will participate in this study.

Sincerely,

Kathy Guth, ARNP
Gynecologic Nurse Practitioner

Carolyn N. Johnson, MD
Obstetrician and Gynecologist

Appendix F

Approved by the Human Subjects Committee Lawrence Campus, University of Kansas.
Approval expires one year from 12/4/2007.

Dear Clinician,
Recently you received a letter inviting you to participant in my dissertation study about the HPV vaccine that may be of interest to you. I hope you will take a moment to review the information statement below, which describes this study and how you can be a part of it. I have enclosed a paper copy of the brief survey and would be most grateful if you would complete and return it back to me in the stamped envelope provided.

Information Statement

The School of Social Welfare at the University of Kansas supports the practice of protection for human subjects participating in research. The following information is provided for you to decide whether you wish to participate in the present study. You should be aware that even if you agree to participate, you are free to withdraw at any time without penalty.

As a doctoral candidate at the University of Kansas, School of Social Welfare, I am conducting this dissertation study to better understand the behaviors of clinicians treating girls aged 9-17 in regards to the new HPV vaccine (Gardasil™). I am also interested in hearing about your perceived barriers and supports that you may encounter related to vaccinating girls aged 9-17. To obtain this information, I am asking for your completion of my questionnaire, which is expected to take approximately 10 minutes to complete.

The content of the questionnaires should cause no more discomfort than you would experience in your everyday life. Participation may benefit you directly, as you have been provided an informational handout on HPV vaccine and state related information. Additionally, for every survey completed, I will donate $1 to the American Cancer Society. There is the potential for $1500 to be donated to this nationally recognized organization.

Your participation is solicited, although strictly voluntary. Your name will not be associated in any way with the research findings. A unique identifier is placed on your return envelope only to assist in tracking non-respondents. Your returned survey, which does not have the unique identifier, will be separated from your envelope to ensure anonymity. Both your returned survey and envelope will be kept in separate locked cabinets.

Completion of the survey indicates your willingness to participate in this project and that you are at least age eighteen. Please complete the entire survey and use the stamped return envelope provided. You may retain this information statement. If you have any additional questions about your rights as a research participant, you may call (785) 864-7429 or write the Human Subjects Committee Lawrence Campus (HSCL), University of Kansas, 2385 Irving Hill Road, Lawrence, Kansas 66045-7563, email dhann@ku.edu. If you would like a copy of the final study results or you would like additional information concerning this study before or after it is completed, please feel free to contact me by phone or mail.

Sincerely,

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Appendix G

HPV Vaccine Related Barriers, Supports, and Clinician Actions Questionnaire

This questionnaire is to assess your perceived barriers, supports, and actions as a clinician as it relates to HPV vaccination of **girls aged 9-12 and 13-17**. It will take approximately 5 minutes for you to complete the entire questionnaire. Included is a self-addressed, stamped envelope for your survey to be returned in within the next 7 to 10 days. As the HPV vaccination is attempting to reduce cervical cancer rates, for every completed survey that is returned for this study, $1 will be donated to the American Cancer Society (http://www.cancer.org), with the potential for $1500 to be donated to this organization. As your time is limited and your responses are very valuable in gathering this important information, this survey has been refined to be quick and easy as possible.

Please **check** the responses that describe your specific practice and demographic characteristics.

1. Type of Clinician:
- ☐ Nurse Practitioner
- ☐ Physician's Assistant
- ☐ Family Physician
- ☐ Pediatrician
- ☐ Gynecologist
- ☐ Other _____

2. Years Practicing as Clinician: _____

3. State in which you Practice:
- ☐ New Mexico — County: _____
- ☐ Texas — County: _____
- ☐ Louisiana — County: _____
- ☐ North Carolina — County: _____

4. Hours a Week of Direct Practice with Girls Aged 9 to 12: _____

5. Hours a Week of Direct Practice with Girls Aged 13 to 17: _____

6. Percentage of Patients Aged 9-17 who are Minority Patients: _____ %
(Minority Patients Include Hispanics, African Americans, Native Americans and Native Alaskans, Asians, Native Hawaiians and other Pacific Islanders)

7. Percentage of Patients Aged 9-17 who are Private Insurance Patients: _____ %

8. Are you or your Employer Registered as an Official Vaccines for Children (VFC) Site?
Yes ☐ No ☐

9. Is your practice through:
- ☐ Public Clinic
- ☐ Private Clinic
- ☐ University Clinic
- ☐ Other: _____

10. Gender: Male ☐ Female ☐

11. Age: _____

12. Ethnic/Racial Category: Please check all that apply

- Black or African American ☐
- Native Hawaiian or Other Pacific Islander ☐
- Latino or Hispanic ☐
- American Indian or Alaska Native ☐
- White or Caucasian ☐
- Asian ☐
- Other: _____ ☐

Please answer the questions below that ask about your HPV vaccination actions.

13. Patient Information-- HPV Vaccination		**Percentage**
a	What percentage of your female patients aged **9-12** have you vaccinated against HPV?	
b	What percentage of your female patients aged **13-17** have you vaccinated against HPV?	
c	Of those female patients you have vaccinated, what percentage have used **private insurance** to cover part or all of the cost of the HPV vaccine?	
d	Of those female patients you have vaccinated, what percentage have received the HPV vaccine for free or at a discount through **public funding**? (Such as Medicaid, VFC, state monies, etc.)	

14. Actions Have you done any of these activities with each age group?		**Girls ages 9-12**		**Girls ages 13-17**	
		Yes	**No**	**Yes**	**No**
a	Sought out more information about HPV or the HPV vaccine				
b	Asked a nurse to counsel a parent on the HPV vaccine				
c	Counseled a parent on the Vaccines for Children Program (VFC)				
d	Referred individual to a specialist for the HPV vaccine				
e	Referred to a public health clinician (clinic or health dept)				
f	Counseled parent on the HPV vaccine (such as on safety, efficacy, cost, sexual nature/implications)				
	In which group does **the parent** typically initiate conversation regarding the HPV				

	vaccine? (may be one or both groups)				
	In which group does **the patient** typically initiate conversation regarding the HPV vaccine? (may be one or both groups)				
	In which group does **another clinician** typically initiate conversation regarding the HPV vaccine? (may be one or both groups)				
	In which group do **you** typically initiate conversation regarding the HPV vaccine? (may be one or both groups)				
g	Other (please explain)				

15. Have you or your clinic ever requested an increased vaccine supply? Yes ☐ No ☐

16. Have you or your clinic ever kept your HPV vaccine supply low to protect against financial loss?
Yes ☐
No ☐

17. How much have you or your clinic spent purchasing and storing the HPV vaccine?
$10,000 or less ☐
$10,001 – 50,000 ☐
$50,001 – 100,000 ☐
$100,001 – 150,000 ☐
$150,001 or more ☐

Below are a number of personal and professional factors that may be connected with vaccination decisions made by clinicians, such as barriers and supports. For each statement, please check the response that best describes how the statement applies to you.
These statements concern only your perceptions, <u>not the perceptions of your patients</u>.

18. Have you experienced any of the following personal or professional barriers (anything that inhibits actions) related to providing the HPV vaccine female patients in these age groups?		**Girls ages 9-12**		**Girls ages 13-17**	
		Yes	**No**	**Yes**	**No**
Personal Barriers					
a	Limited personal knowledge or education on HPV or HPV vaccine				
b	Personal discomfort with talking with parents about the HPV vaccine for girls because of its sexual nature				
c	Concerns about Merck's Products or the Lobbying by Merck for Gardasil™				

d	Belief that media is marketing the HPV vaccination too much				
e	Limited personal knowledge or education about the current policy initiatives in your state promoting HPV vaccination				
Professional Barriers					
f	Concerns about the safety of the vaccine (short-term or long-term effects)				
g	Concerns about the effectiveness of the vaccine				
h	Belief that giving the HPV vaccine is outside the scope of your practice or medical specialty				
i	Concerns that HPV vaccine will reduce future Pap Smear screenings				
j	Concerns about the financial burden of the HPV vaccine (cost to patient, limited insurance coverage, or cost to clinic)				
k	Concerns about patients' negative perceptions of the HPV vaccine				
l	Concerns about your state's policy initiative (or lack of policy initiative) to increase HPV vaccination				
m	Other (Personal or Professional): Please explain				

19. Of all the barriers you have experienced, which two have had the most impact on inhibiting your vaccination of girls aged 9-12 and 13-17? Please identify in the space below.

20. Have you experienced any of the following personal or professional supports (aids to vaccination) related to providing the HPV vaccine to female patients in these age groups?		**Girls ages 9-12**		**Girls ages 13-17**	
		Yes	**No**	**Yes**	**No**
Personal Supports					
a	Personal comfort level talking with parents of girls about the HPV vaccine and the sexual nature of HPV				
b	Having a positive personal experience related to the HPV vaccine (such as having a				

	daughter vaccinated)				
c	Personal attitude/belief that administering the HPV vaccine will have a positive impact on young women's lives				
d	Exposure from the media about the HPV vaccine				
Professional Supports					
e	Extra information provided within employment site about HPV or the HPV Vaccine				
f	Presentation from a social worker or medical professional about how to talk with parents about the vaccine				
g	Presentation from a social worker or medical professional about the options for financial assistance for the vaccine				
h	Having the opportunity to provide the vaccine free or at reduced cost to those who do not qualify for Medicaid or low-income assistance				
i	Having either an internal or external forum to talk with other clinicians about the HPV vaccine				
j	Professional adherence to the Advisory Council on Immunization Practices (ACIP) recommendations for HPV vaccination of female patients				
k	Your state's policy initiative aimed at promoting HPV vaccination				
l	Other (Personal or Professional): Please explain				

21. Of all the supports you have received, which two have had the most impact on promoting your vaccination of girls aged 9-12 and 13-17? Please identify in the space below.

Thank you for your time and effort! It is greatly appreciated!

Appendix H

Approved by the Human Subjects Committee Lawrence Campus, University of Kansas. Approval expires one year from 12/4/2007.

Hello! I am a doctoral candidate at the University of Kansas, School of Social Welfare. I am interested in understanding your perceptions and behaviors with the new HPV vaccine, particularly around vaccination of girls between the ages of 9 and 17. You have been selected to participate in this study, which involves taking a short survey. You will find a letter of support on the backside of this page from clinicians like yourself who are familiar with my study. For your convenience there is a stamped envelope for you to return your completed survey. Important information about the benefits of the study and consent information is described below.

Information Statement

The School of Social Welfare at the University of Kansas supports the practice of protection for human subjects participating in research. The following information is provided for you to decide whether you wish to participate in the present study. You should be aware that even if you agree to participate, you are free to withdraw at any time without penalty.

As a doctoral candidate at the University of Kansas, School of Social Welfare, I am conducting this dissertation study to better understand the behaviors of clinicians treating girls aged 9-17 in regards to the new HPV vaccine (Gardasil™). I am also interested in hearing about your perceived barriers and supports that you may encounter related to vaccinating girls aged 9-17. To obtain this information, I am asking for your completion of my questionnaire, which is expected to take approximately 10 minutes to complete.

The content of the questionnaires should cause no more discomfort than you would experience in your everyday life. For every survey completed, I will donate $1 to the American Cancer Society. There is the potential for $1500 to be donated to this nationally recognized organization. There is also relevant HPV information at my google page, which is listed below.

Your participation is solicited, although strictly voluntary. Your name will not be associated in any way with the research findings. A unique identifier is placed on your return envelope only to assist in tracking non-respondents. Your returned survey, which does not have the unique identifier, will be separated from your envelope to ensure anonymity. Both your returned survey and envelope will be kept in separate locked cabinets.

Completion of the survey indicates your willingness to participate in this project and that you are at least age eighteen. Please complete the entire survey and use the stamped return envelope provided. You may retain this information statement. If you have any additional questions about your rights as a research participant, you may call (785) 864-7429 or write the Human Subjects Committee Lawrence Campus (HSCL), University of Kansas, 2385 Irving Hill Road, Lawrence, Kansas 66045-7563, email dhann@ku.edu. If you would like a copy of the final study results or you would like additional information concerning this study before or after it is completed, please feel free to contact me by phone or mail.

Sincerely,

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